OBIS
Safety and Emissions Analyzer System

Operating Instructions

Pennsylvania

Snap-on Diagnostics

Table of Contents

Using This Manual . . . . . ***v***
Safety Information . . . . . ***I***
Introduction and Equipment Overview ***1-1***
Clean Air and Vehicle Emissions 1-1
Engine Combustion 1-2
Pollutants 1-2
Acronyms and Terms 1-3
Equipment Overview 1-4
Analyzer Front 1-4
Analyzer Back 1-6
User PC Function 1-8
Bar Code Scanner 1-9
Remote Control 1-9
Gas Cap Tester 1-9
System Security 1-10
Using the Keyboard 1-10
Function Keys 1-10
Data Entry Keys 1-11
Calculator and Movement Control Keys 1-11
Using the Remote Control Keypad 1-12
General Vehicle Inspection 1-14
Accessing and Aborting Tests 1-14
Using the Bar Code Scanner 1-16
Software Overview 1-18
Powering Up the Analyzer 1-18
Inspection Mode 1-18
PC Mode 1-19
System Security 1-19
Monitor Screens 1-20
Main Menu 1-23
Software Flowchart 1-25
Vehicle Emissions Inspection ***2-1***
Test Types 2-1
Vehicle Data Entry 2-2
Vehicle Found on the VID 2-6
Vehicle Not Found on the VID 2-10
Fuel Cap Test 2-12
OBD Test 2-16
After Repairs Tests 2-23
Equipment Maintenance Menu ***3-1***
Status Screen 3-2
Fuel Cap Pressure Test Calibration 3-3
Sticker Maintenance ***4-1***
Issue Waiver Sticker 4-2
This Year's Mileage Less Than 5000 4-6
New Vehicle Exemption 4-8
Sticker Replacement 4-8
Voided or Damaged Sticker 4-8
Missing or Stolen Sticker 4-8
Issue Diagnostic Exemption 4-9
Diagnostic Functions ***5-1***
Snap-Link 5-1

OBDII Test 5-2
Barcode Reader Test 5-4
Gas Cap Integrity Test 5-5
Station Menu 6-1
Print Sticker Used Report 6-2
Network Communications Diagnostics 6-3
Modem Diagnostics 6-4
Dial Tone Check 6-4
Network Diagnostics 6-5
Troubleshooting Communication Problems 6-6
Data File Refresh 6-7
Previous Vehicle Inspection History 6-8
Print Communication Log 6-9
Test Record Search and Retrieval 6-10
Request Lockout Status 6-11
Emergency Software Update 6-13
Remote Software Update 6-14
Other Functions 7-1
VIR Reprint / Record Search - Retrieval 7-1
Training Mode 7-3
Print Rejection From Testing Forms 7-4
General Maintenance 8-1
General Routine Maintenance 8-1
Printer Operation and Maintenance 8-1
Maintaining the Bar Code Scanner 8-2
Cleaning the Scanning Window 8-2
Checking the Scanner Case 8-2
Connection Panels 8-3
Analyzer Back Panel 8-3
Interface Box 8-4
Accessories and Options 8-5
Standard Accessories 8-5
Options 8-5
Appendix A: OBD II Connections A-1
Key Terms A-1
OBD II and What it Means A-4
The Data Link Connector (DLC) A-5
OBD II A-6
OBD II Drive Cycles/Readiness Monitors A-6
OBD II Monitors A-7
Future OBD II A-8
Powertrain System Diagnostic Trouble Codes A-8
Standardized Fault Code Format A-9
Codes Only—OBD II Diagnostic Trouble Codes A-9
DTC Naming Guidelines for Signals from Components A-11
Communication Problems A-12
OBD System Testing A-14
The Malfunction Indicator Lamp A-17
OBDII Connections A-18
OBD II Connections Table A-19
2002 . . . . . A-19
2001 . . . . . A-29
2000 . . . . . A-38
1999 . . . . . A-45
1998 . . . . . A-53
1997 . . . . . A-59
1996 . . . . . A-66

Using This Manual

This manual contains instructions for set-up and use of the vehicle emissions inspection/maintenance (I/M) analyzer. It contains a table of contents to make information easy to find.

Using I/M Software

This documentation assumes that the I/M software is properly installed and operating on a host compatible with the software. The instructions assume that the operator has a basic understanding of personal computer (PC) operation. For PC-related questions refer to the manuals accompanying the host computer.

IMPORTANT

The computer supplied with the analyzer is not equipped with virus protection software. It is strongly recommended that you purchase and install virus protection software on the computer hard drive.

✓ You will be billed for all computer virus service calls.

IMPORTANT

The computer supplied with the analyzer has no surge protection or battery backup. It is strongly recommended that you purchase and install a surge protector or universal power supply (UPS) battery backup with surge protection, to avoid damage from power fluctuations and improper shutdowns.

This documentation is designed for use in conjunction with the online software HELP built into the analyzer. Press F1 on the keyboard to display HELP messages on the analyzer screen.

Warranty Service

Repair and service must be performed according to your warranty/ service agreement. Refer to the warranty statement, a separate document provided with the analyzer, for exact coverage and details. Call ***EquiServ*** at 1-800-225-5786 for analyzer repair service.

Conventions

This section lists the various types of information used in this manual.

Check Note

A check note provides additional information about the subject in the preceding paragraph.

Example:

✓ You will be billed for all computer virus service calls.

Testing Tips

Testing tips provide information that applies to a specific test. Each testing tip is introduced by this icon ❑ for easy identification.

Example:

❒ Read and follow all Safety Messages in this manual.

Chapter References

Additional information in text is referenced by chapter section and page number.

Example:

See *Using I/M Software on page i-iii.*

Equipment Damage

The possibility of damage to vehicle or equipment is introduced by a signal word indicating this condition.

Example:

IMPORTANT — **To prevent hard drive corruption, always power-down the analyzer computer by turning off the main power switch, located on the back of the analyzer, when an analyzer system menu is displayed.**

Safety Messages

Safety messages are provided to help prevent personal injury and equipment damage. All safety messages are introduced by a signal word indicating the hazard level. The types of safety messages are:

⚠DANGER — **Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or to bystanders.**

⚠WARNING — **Indicates a potential hazard which, if not avoided, could result in death or serious injury to the operator or to bystanders.**

⚠CAUTION

Indicates a potential hazard which, if not avoided, may result in minor or moderate injury to the operator or to bystanders.

The three-part message panel, used with safety messages, uses Three different type styles further define the potential hazard:

- Normal type states the hazard,
- **Bold type** states how to avoid the hazard, and
- *Italic type* states the possible consequences of not avoiding the hazard.

Some safety messages contain visual symbols with signal words.

Example:



Risk of burns.
Do not remove radiator cap unless engine is cold. Pressurized engine coolant may be hot.
Hot engine coolant can cause serious burns.

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Safety Information

For your safety, read this manual thoroughly before operating the Analyzer System.

The Analyzer System is intended for use by properly trained, skilled professional automotive technicians. The safety messages presented in this section and throughout this manual are reminders to the operator to exercise extreme care when using this test instrument.

There are many variations in procedures, techniques, tools and parts for servicing vehicles, as well as in the skill of the individual doing the work. Because of the vast number of test applications and variations in the products that can be tested with this instrument, the manufacturer cannot possibly anticipate or provide advice or safety messages to cover every situation. It is the automotive technician's responsibility to be knowledgeable of the system that is to be tested. It is essential to use proper service methods and test procedures and to perform tests in an appropriate and acceptable manner that does not endanger your safety, the safety of others in the work area or the equipment or vehicle being tested.

It is assumed that, before using this tool, the operator has a thorough understanding of vehicle systems. Understanding the principles and operating theories of vehicle systems is necessary for competent, safe and accurate use.

Before using the Analyzer System, always refer to and follow the safety messages and applicable test procedures provided by the manufacturer of the equipment or vehicle being tested.

Read All Instructions

Read all instructions and safety messages in this manual. All safety messages in this section contain a signal word, a three-part message, and, in some instances, a symbol/pictorial.

The signal word indicates the level of hazard in a situation.



Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or bystanders.

WARNING

Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to the operator or bystanders.

CAUTION

Caution indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor injury to the operator or bystanders.

IMPORTANT

Important indicates the possibility of damage to vehicle or equipment.

Some safety messages contain visual symbols with signal words. For example:



Risk of burns.
Do not remove radiator cap unless engine is cold. Pressurized engine coolant may be hot.
Hot engine coolant can cause serious burns.

An icon, when present, gives a graphical description of the potential hazard.

Safety messages in this section contain three different type styles.

- Normal type states the hazard.
- **Bold type** states how to avoid the hazard.
- *Italic type* states the possible consequences of not avoiding the hazard.

Important Safety Instructions



Risk of electric shock.

- **Connect power cord to properly grounded outlet. Do not remove or bypass the grounding pin.**
- **Do not touch ignition coils, coil terminals and spark plugs while operating. Ignition coils, coil terminals and spark plugs emit high voltage.**
- **Use extreme care when working around spark plugs, spark plug wires and coil terminals while engine is running.**
- **Do not use any test lead, pickup or adaptor, other than those intended for use with this product.**

Electric shock can cause serious injury.



Risk of poisoning.

- **Use this equipment in locations with mechanical ventilation providing at least four air changes per hour. Engine exhaust contains carbon monoxide gas, a colorless, odorless lethal gas.**
- **Route exhaust outside while testing with engine running.**

Poisoning can result in death or serious injury.





Risk of explosion.

- **Wear safety goggles and protective clothing, user and bystander.**
- **Use this equipment in locations with mechanical ventilation providing at least four air changes per hour.**
- **Do not smoke, strike a match, place metal tools on battery or cause a spark in the vicinity of the battery. Battery gases can ignite.**
- **Avoid making accidental connection between battery terminals through tools, jumper leads, etc.**
- **Properly secure calibration gas bottle to prevent damage. Damaged gas bottles can explode.**

Explosion can cause death or serious injury.





Risk of fire.

- **Wear safety goggles and protective clothing, user and bystander.**
- **Do not position head directly over or in front of the carburetor or throttle body. Do not pour gasoline down the carburetor or throttle body when cranking or running the engine, when working with fuel delivery systems or any open fuel line. Engine backfire can occur when the air cleaner is out of normal position.**
- **Do not use carburetor sprays or fuel injector cleaning solvents when performing diagnostic testing.**
- **Keep a dry chemical (Class B) fire extinguisher rated for gasoline, chemical and electrical fires in the work area.**

Fire can cause death or serious injury.



Risk of fire.

- **Be aware that many systems maintain residual pressure in the line after the engine is turned off.**
- **Wipe up fuel spills immediately.**
- **Turn vehicle off before connecting or disconnecting equipment.**
- **Keep shop rags, towels, paper, oils, fuel, plastics and other combustible materials clear of vehicle exhaust and evacuation hoses.**
- **Keep a dry chemical (Class B) fire extinguisher rated for gasoline, chemical and electrical fires in the work area.**

Flames can cause serious injury.





Risk of expelling fuel, oil vapors, hot steam, hot toxic exhaust gases and other debris.

- **Wear safety goggles and protective clothing, user and bystander.**
- **Engine systems can malfunction expelling fuel, oil vapors, hot steam, hot toxic exhaust gases and other debris.**

Fuel, oil vapors, hot steam, hot toxic exhaust gases, and other debris can cause serious injury.



Risk of burns.
Do not remove radiator cap unless engine is cold. Pressurized engine coolant may be hot.
Hot engine coolant can cause serious burns.



Risk of burns.

- **Do not touch hot exhaust systems, manifolds, engines, radiators, sample probe, etc.**
- **Wear gloves when handling hot engine components, such as PCV and EGR valve.**
- **Wear gloves when handling hot exhaust sample probe.**

Hot components can cause burns.





The engine compartment contains electrical connections and hot or moving parts.

- **Do not place test equipment or tools on fenders or other places in the engine compartment.**
- **Keep yourself, test leads, clothing and other objects clear of electrical connections and hot or moving engine parts.**
- **Keep hands, feet, clothing and test equipment away from moving parts.**
- **Barriers are recommended to help identify danger zones in test area.**

Contact with electrical connections and hot or moving parts can cause injury.

SAVE THESE INSTRUCTIONS

1 Introduction and Equipment Overview

Clean Air and Vehicle Emissions

The government recognized vehicle emissions as a source of air pollution when it passed the Air Act. While the Act did not establish vehicle emissions standards, it did authorize the government to contribute to local air pollution control efforts. However, amendments to the Act required that manufacturers equip all cars and light trucks with emissions pollutant controls. Subsequent research produced technologies to develop more effective control methods.

Prior to the Air Act, the effects of automobile emissions on air quality were not well understood. Smog was thought to be a mixture of smoke and fog—the two words that "smog" comes from. Soon, more comprehensive studies showed that over 40% of all air-born emissions were by-products of automobile exhaust. Smog was found to be the result of a chemical reaction that occurs in sunlight between hydrocarbons (HC) and oxides of nitrogen (NO_2). Once the government understood the contribution of vehicle emissions to air pollution, it formulated legislation to control it.

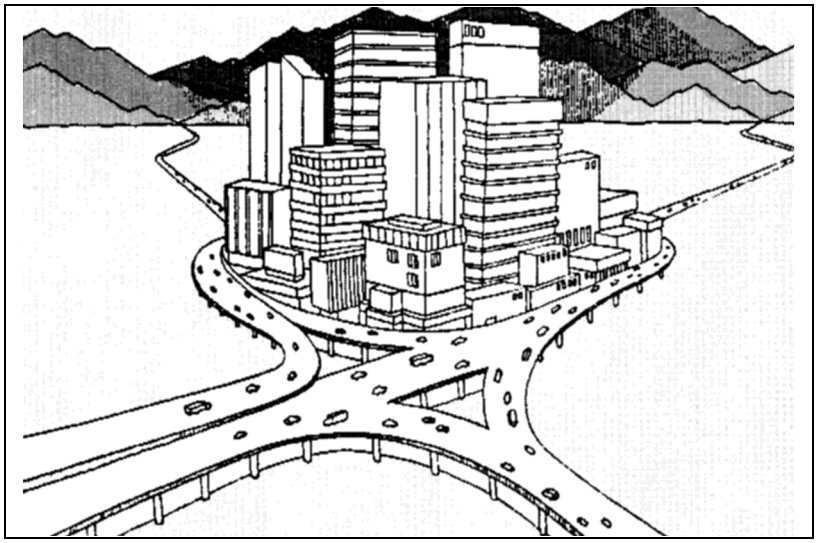


Figure 1-1: Controlling Vehicle Emissions Pollutants Leads to Cleaner Air

Engine Combustion

Understanding how vehicles produce pollutive emissions requires an understanding of engine combustion. The regulated pollutants carbon monoxide, hydrocarbons, and oxides of nitrogen are by-products of the fuel burning process.

The internal combustion engine combines gasoline fuel (hydrocarbons), air (oxygen), and fire (ignition) in a combustion chamber to produce energy to drive the wheels of a car. Effective control of each component maximizes the power and efficiency of the engine. A carburetor or fuel injector determines the air/fuel mixture; precisely timed spark firing synchronizes piston action; and the amount of compression determines the power of combustion explosion. If all these components worked perfectly, complete combustion would take place. During complete combustion, no excess fuel goes unburned, and all available oxygen burns. However, in the real world many factors create conditions which are unfavorable for complete combustion. Contributing factors include degraded engine and cylinder conditions, impure fuel, the natural impurities in the air, and imprecise combustion timing. Consequently, we must monitor vehicle emissions pollutants in order to limit their contribution to air pollution.

Pollutants

Some by-products of internal combustion engines have all been recognized as hazardous in high concentrations. These pollutants alter the composition of the air we breath, which is usually 78% nitrogen, 20.8% oxygen, and 1% trace elements.

Carbon Monoxide (CO)

A major component of polluted air is carbon monoxide (CO). CO is a colorless, odorless gas which, when concentrated, is toxic. Any fueled engine properly adjusted and in good operating condition produces relatively low CO readings. Excessive CO develops when the combustion chamber is receiving a large volume of fuel and a proportionately small amount of air. By weight, carbon monoxide accounts for about 47% of air pollution produced by vehicle emissions.

Oxides of Nitrogen (NO_2)

Another pollutant comes in the form of oxides of nitrogen (NO_2). Oxides of nitrogen consist of nitrogen combined with varying amounts of oxygen. NO_2 is produced by heat and pressure during the combustion process and is a main component in photochemical smog, described earlier.

Hydrocarbons (HC)

Of greater concern today, however, is unburned gasoline which is composed of hydrocarbons (HC). When combustion is incomplete due to a lack of oxygen, insufficient temperatures, or any of a number of other problems, a certain amount of raw fuel remains unburned. Even a tuned engine, in good mechanical and electrical condition, emits some HC. Excessive HC in non-catalytic reactor vehicles is the result of incomplete combustion because of mechanical, electrical, or carburetor defects.

HC consists of carbon and hydrogen atoms in various combinations and, like NO_2, is a major component in the formation of photochemical smog.

Carbon Dioxide (CO_2)

Carbon dioxide (CO_2) is also a by-product of combustion and is non-toxic at low levels (we exhale CO_2 when we breathe). It is the result of one carbon molecule joining with two oxygen molecules in the combustion chamber and is sent out through the exhaust with HC, CO, and O_2.

Controlling Vehicular Emissions Pollutants

To meet federal standards for vehicle emissions, manufacturers developed various emission controls. Since these controls were developed to quickly respond to Clean Air Act mandates, they were developed within a few years of each other. Manufacturers considered overall vehicle operation as well as individual control systems, which were tailored not only to control specific pollutants but to interact with the other systems as well.

Vehicle emissions controls can be classified into two categories: those that prevent the formation of pollutants (pre-combustion) and those that reduce or control emissions levels (post-combustion). It take less effort and is less expensive to prevent the production of pollutive emissions than to destroy the pollutants after formation. Therefore, pre-combustion control is by far the most effective and widely used of the two types of emissions control systems.

Excessive emission of HC, CO, and NO_2 have been identified as a probable cause of numerous health problems. In addition, excessive NO_2 contributes extensively to excessive smog production, which causes respiratory problems in much of the general population. Studies show that controlling vehicle emissions is among the most effective methods for improving air quality. Vehicles that emit “clean” emissions improve their fuel economy and vehicle performance as well as the environment.

Acronyms and Terms

BMV	Bureau of Motor Vehicles
DLC	Data Link Connector
DTC	Diagnostic Trouble Codes
KOEO	Key On Engine Off
KOER	Key On Engine Running
MIL	Malfunction Indicator Light
OBD	Onboard Diagnostic
PCM	Powertrain Control Module
SAE	Society of Automotive Engineers
TIN	Transaction Identification Number
TSB	Technical Service Bulletins
VIN	Vehicle Identification Number
VIR	Vehicle Inspection Report

Equipment Overview

The equipment consists of the analyzer that contains a PC, a bar code reader, a remote control and a gas cap tester. For more details about each component, see:

- *Analyzer Front, page 1-4*
- *Analyzer Back, page 1-6*
- *User PC Function, page 1-8*
- *Bar Code Scanner, page 1-9*
- *Remote Control, page 1-9*
- *Gas Cap Tester, page 1-9*

Analyzer Front

Most of the I/M analyzer operating controls are available from the front of the unit. This section describes the items labeled on the analyzer front view shown in *Figure 1-2*.

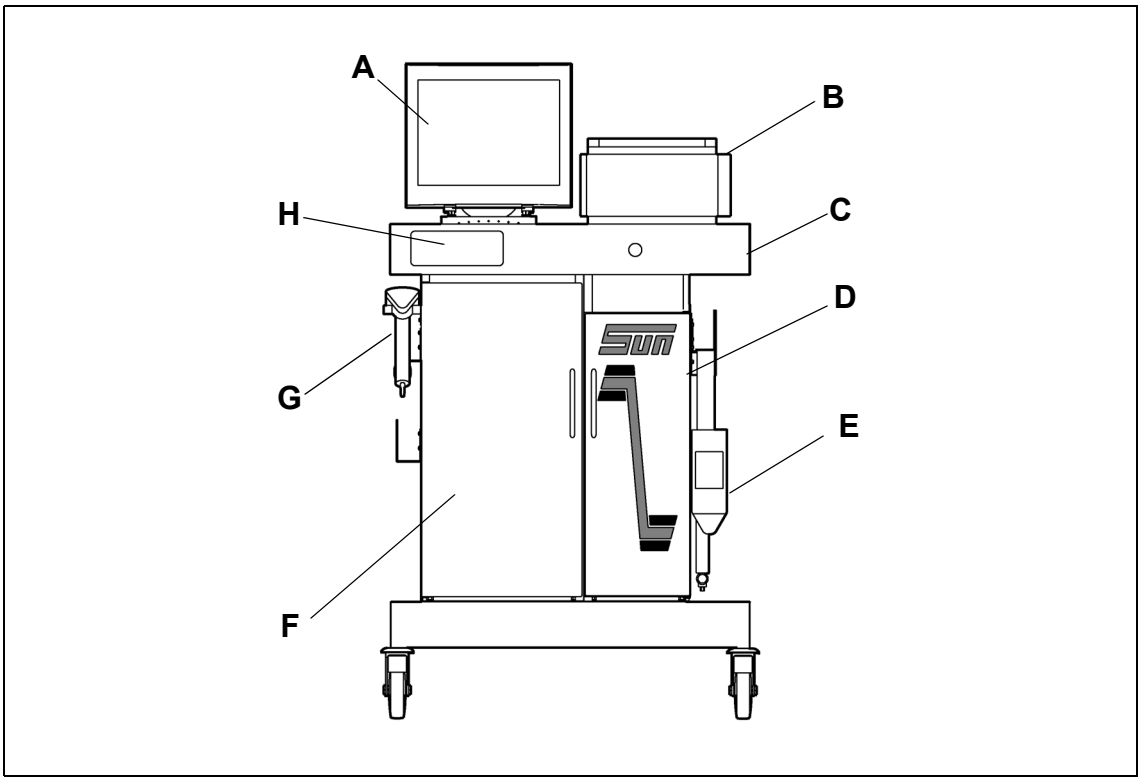


Figure 1-2: Analyzer, Front View

A Monitor

Specifications and Contrast Controls
The monitor offers a high-resolution color VGA monitor display. Use the contrast controls, located below the monitor screen, to adjust the monitor to shop lighting conditions.

Layout, Prompts, HELP Messages
Interaction with the I/M analyzer computer occurs through the monitor. For more information, refer to *Monitor Screens, page 1-20*.

B	**Report Printer**	A non-secured printer using 8-1/2” x 11” one-part paper produces the vehicle report, and can also produce a hard copy of test results compiled during tune-up emissions analysis, weekly gas calibration, etc. May also be used to print most monitor screen displays (press the PRINT SCRN key). Always verify that the report printer is ON and has paper before printing. For additional information about printer operation, refer to the user’s manual included with the printer.
C	**Mouse and Keyboard**	The mouse is located inside a drawer on the front of the analyzer. Use the mouse to select buttons and make selections from drop-down lists for I/M functions on the monitor screen. The keyboard is located inside a drawer on the front of the analyzer. Use the keyboard to select I/M functions that display on the monitor screen, advance through test sequences, and enter data into on-screen fields.
D	**Locked Equipment Compartment**	The locked equipment compartment houses the computer. This compartment is locked, but may be opened by the equipment owner to install software on the PC. — For PC information, reference the literature package provided with the PC.
E	**Gas Cap Tester**	Used when performing Gas Cap Tests, as part of the inspection process. A box with adaptors for testing is also provided. See *Figure 1-1*.
F	**Storage Cabinet**	This cabinet is for storage of additional portable equipment or other necessary items.
G	**Bar Code Scanner**	Used for quick data entry of information in bar code form.
H	**Remote Control**	Used to make menu selections and operate most analyzer functions.

Items Not Shown

Computer Components		The following items are located on the computer inside the locked equipment compartment.
	DVD-ROM Drive	Analyzers are equipped with a digital video drive (DVD), which is located near the top of the PC tower.
	Floppy Disk Drive	This disk drive is referred to a drive "A:/". Can be used to load program and diagnostic software on the computer.
	PC Power/Reset Switch	This switch is located above the ***DELL*** logo. Press to clear the monitor and reboot (restart) the computer, if necessary. For information about orderly power-downs, refer to *Powering Up the Analyzer, page 1-18*. — Do not use this switch to turn off the PC.
	Flip-Up Cover	One additional USB port and a headphone jack are located under this cover on the lower portion of the PC tower.
	Interface Box	The interface box is located behind the left front door. No user action is required for proper analyzer operation. See *Connection Panels, page 8-3* for a description of the interface box.

Analyzer Back

Some analyzer controls, auxiliary assemblies, and connections are located on the back of the unit. This section describes the items labeled on the analyzer rear view, shown in *Figure 1-3*.

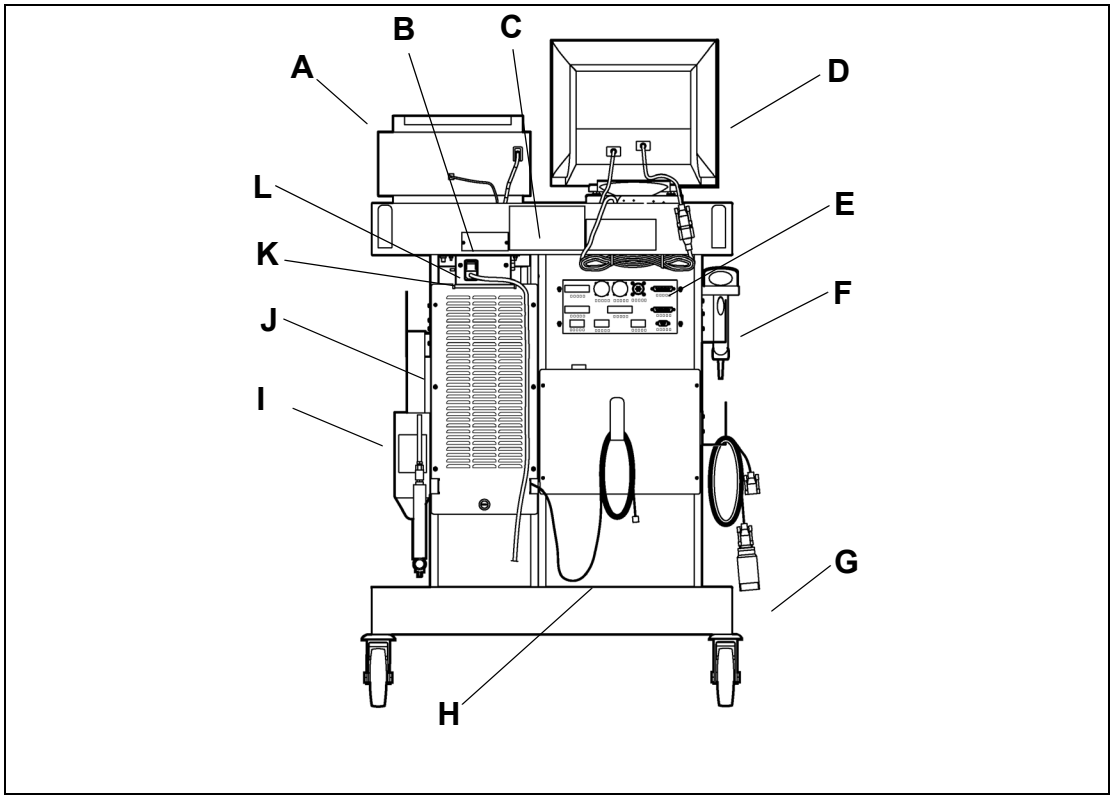


Figure 1-3: Analyzer, Rear View

A	**Report Printer**	See *Analyzer Front, page 1-4*.
B	**ID Plate**	Contains the following: • Model number, • Serial number, • Voltage requirements, and • Patent information/listings.
C	**Warning Label**	Contains critical safety messages.
D	**Monitor**	See *Analyzer Front, page 1-4*.
E	**Connection Panel**	Provides connections for options. See *Analyzer Connection Panel, page 1-7*.
F	**Bar Code Scanner**	Used for quick data entry of information in bar code form.
G	***OBD II* Interface**	*OBD II* cable and adaptor.
H	**Telephone Cord**	Accommodates off-site modem communication. — Be sure the cord is securely plugged into a telephone wall outlet when in use.
I	**Gas Cap Tester**	***Waekon*** gas cap tester.

J	**Ventilation Grate / Access Panel**	When access panel is removed, rear PC connectors are exposed. — Service must open with a special key.
K	**Main Power Switch**	The main power switch, located on the right rear of the unit, completely shuts off power to the analyzer. Press the rocker switch to the left or right to turn the analyzer on or off.
L	**Power Cord**	Connects analyzer to main power source.

Analyzer Connection Panel

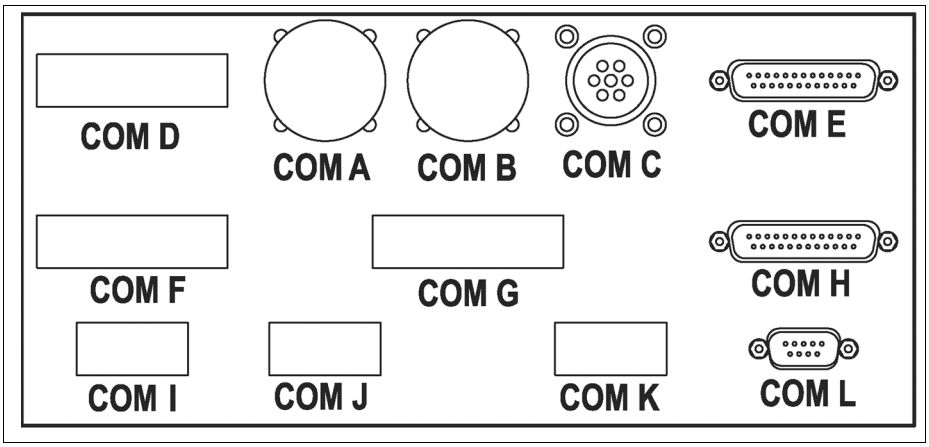


Figure 6-2: Connection Panel, Back of Analyzer

✓ Ports used depend on State requirements and optional equipment added to the analyzer. Some options may not be available for specific analyzer systems.

Ports and Connections

COM A	Not used
COM B	Not used
COM C (CPC Connector)	Gas cap tester (not used)
COM D	Not used
COM E (DB-25 Connector)	***Snap-Link*** Cable
COM F	Not used
COM G	Not used
COM H (DB-25 Connector)	Bar code scanner
COM I (DB-9 Connector)	Spare, Comm One Serial
COM J	Not used
COM K	Not used
COM L (DB-9 Connector)	*OBD II* cable

User PC Function

The analyzer is designed to provide full access to all standard PC capabilities running on ***Windows 2000***.

Two modes of operation are possible:
- Inspection Mode
- PC Mode

Inspection Mode

Use this mode to perform state inspections after a valid authorization access code is entered. The inspection mode is secure. You can neither access nor change the operating program and stored data. The computer is equipped with "logical" security and code encryption, which prevent unauthorized access. Attempting to "crack" the system renders the unit non-operational and you will be charged for any service call required to return the analyzer to service. The state is also notified of the attempt to tamper.

PC Mode

Use this mode to operate the analyzer like a standard PC with ***Windows***.

✓ Different access codes are required than for Inspection Mode.

All ***Windows 2000*** compatible programs can be loaded and run on the PC, including ***ShopKey*** shop-management and vehicle repair software programs available from your ***Snap-on*** representative.

The analyzer is equipped with a ***DELL*** computer that has the following minimum specifications:
- 2.00 GHz or faster processor
- 128 MB RAM
- 40 GB hard drive
- 56 K modem
- 16x DVD drive
- 3.5" floppy drive
- Spare USB port (on front of PC, behind lower cover)
- Spare RS232 communication port (back of the analyzer)

If you are unfamiliar with PC hardware or ***Windows*** software, it is strongly recommended that you obtain instructional materials before attempting to use the PC functions.

The analyzer system warranty does not cover the installation, training, technical assistance or repair of any software on the PC side of the analyzer. All software you install or devices you connect to your system are solely your own responsibility.

If a virus infects your computer, it is your own responsibility. We strongly recommend that you purchase and install virus protection software, such as ***Norton AntiVirus***.

All service calls necessary as a result of user-installed software, hardware or the occurrence of a virus will be billed to you. Service personnel will return the unit to its original configuration and provide suggestions to prevent additional problems. ***EquiServ*** does not service or repair items that are not provided by ***Snap-on***.

Bar Code Scanner

The bar code scanner, located on the side of the unit, eliminates certain keyboard entries by entering a complete field of data into the analyzer through a simple scan. The hand-held scanner reads bar codes and symbols in hard-to-reach places (such as labels on engines, hoods, government-provided access cards, and vehicle information documents).

Remote Control

Use the remote control to operate the analyzer from around the vehicle or when testing requires controlling the analyzer apart from the keyboard.

Gas Cap Tester

The ***Waekon*** gas cap tester is used with the analyzer for gas cap testing. See the manual that accompanies the tester for specifications and detailed operation information.

Waekon

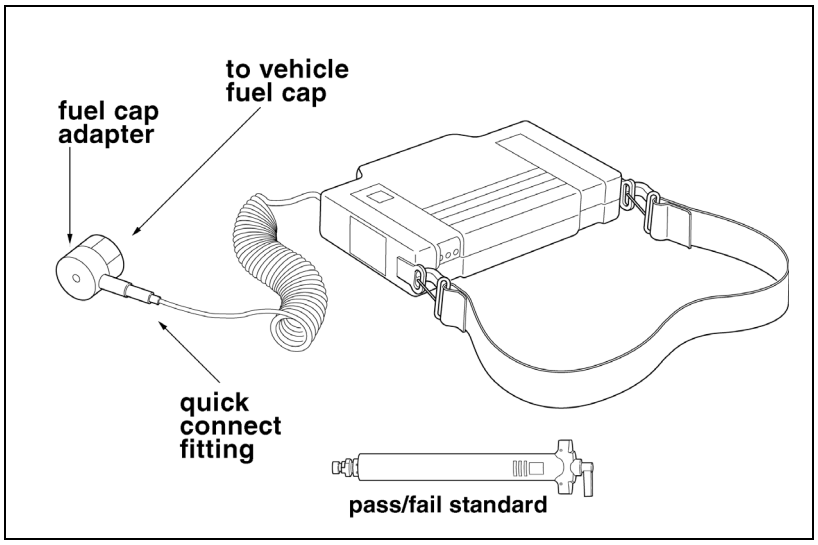


Figure 1-1: ***Waekon*** Gas Cap Tester

System Security

The analyzer can detect computer and data storage tampering. The tamper condition is identified by the program and recorded on the hard drive. Only state or service personnel can remove the tamper condition and return the analyzer to operation.

IMPORTANT

Attempting to access secured areas will invoke an analyzer lockout.

- **The analyzer will not perform I/M emission inspections if it is locked out.**
- **Only service personnel can unlock the analyzer, and you will be billed for the service call.**

Using the Keyboard

This section describes the function of several types of keys on the analyzer keyboard: Data Entry Keys, Tab Key, Enter Key and Movement Control Keys. Also available for remote analyzer operation is the Remote Control Keypad. See *Remote Control, page 1-9*.

Function Keys

The software operates with a standard keyboard and keyboard functions for PC/***Windows***.

ESC/ABORT Abort a vehicle inspection or backs out of the current menu/function. When ESC is pressed during the inspection, the question DO YOU WANT TO ABORT THE TEST? displays.
— Select YES to abort the test.
— Select NO or press ESC a second time to return to the inspection.
During inspections, programming returns to the Main Menu.

F1/HELP Press to display on-screen HELP information. HELP contains additional test instructions or explanations when available. There are two types of HELP:
— **System-wide HELP** provides general information about the currently displayed function.
— **Vehicle inspection HELP** provides detailed input information about entries that must be completed by the operator.

F2/CLEAR Press to clear data from a data entry field.

F9/BACKUP Press to move backwards in a procedure sequence.

F10/CONTINUE Press to move forward in a procedure sequence.

F11/PRINT SCREEN This function is available to produce a hard copy of the current screen, except during vehicle emissions testing.
— Scroll lock and pause break keys are not applicable.

F12/STATUS Display system faults or warnings currently present when STATION LOCKOUT, SYSTEMS FAULT PRESENT or SYSTEM WARNING PRESENT appear in the lower right of the screen.

Data Entry Keys

1 through 9	Enter numbers.
Aa through Zz	Enter letters.
Punctuation	Enter punctuation or symbols.
BACKSPACE	Delete a previous entry.
CAPS LOCK	Enter capital letters. All letters are capitals until CAPS LOCK is pressed a second time.
ENTER	Confirm an action and store information in memory.
SHIFT	Invoke a key's second character or function.
SPACE BAR	Add a space character. — The CTRL and ALT keys are not applicable
Delete	Clear all contents in a data entry field

Calculator and Movement Control Keys

Calculator Keys	Calculator keys are numbered keys that are arranged as if on a calculator and perform the same function when NUM LOCK is pressed.

Movement Control Keys

TAB	Move the cursor to the next field in the screen. Store information from the previous field into memory.
SHIFT + TAB	Move the cursor to the previous field in the screen. Store information from the field just exited into memory.
PAGE UP	Return to a previous page.
PAGE DOWN	Advance to the next page.
DELETE	Delete current characters.
Down-Arrow	Reveal drop-down menu, then move down in the list
Up-Arrow	Move up in a list

Using the Remote Control Keypad

Use the remote control keypad as a keyboard when providing computer input from a remote location.

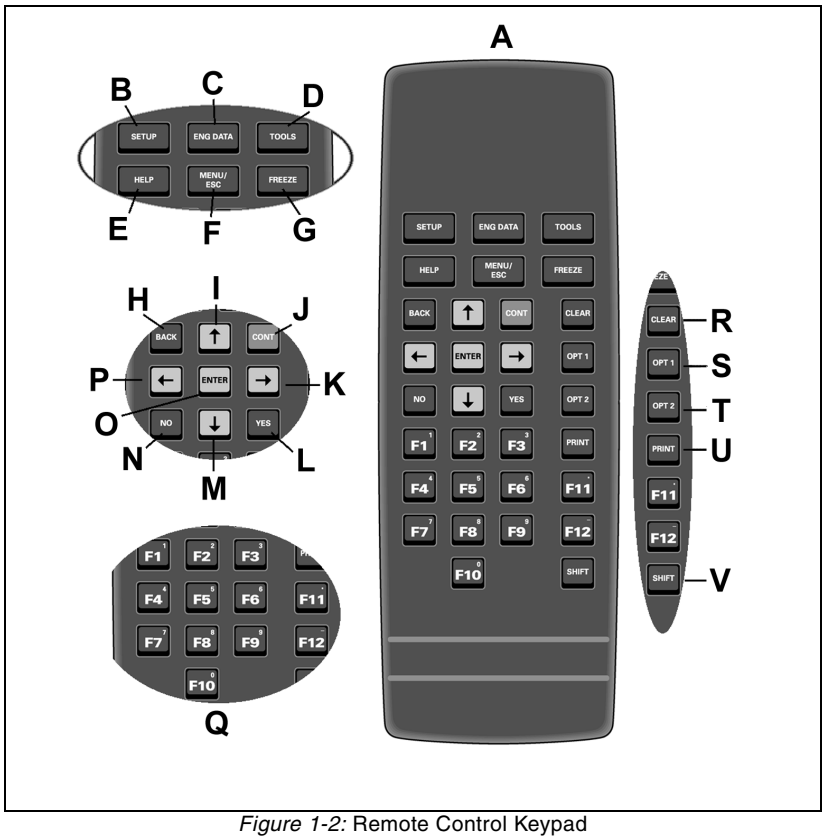


Figure 1-2: Remote Control Keypad

A – Remote Control Unit	Use the keys on this unit, to access, navigate, or exit the I/M software from a remote location.
B – Setup	Not used for I/M testing.
C – Eng Data	Not used for I/M testing.
D – Tools	Not used for I/M testing.
E – HELP	Not used for I/M testing.
F – Menu/ESC	Not used for I/M testing.
G – Freeze	Not used for I/M testing.
H – Back	Not used for I/M testing.
I – Up Arrow	Press to move cursor toward top of screen.
J – CONT	Not used for I/M testing.
K – Right Arrow	Press to move cursor toward right side of screen.
L – Yes	Not used for I/M testing.
M – Down Arrow	Press to move cursor toward bottom of screen.
N – NO	Not used for I/M testing.

O – Enter	Press to complete data entry.
P – Left Arrow	Press to move cursor toward left side of screen.
Q – Function/Numeric Keys	Press these keys to select various functions. F1/HELP to display on-screen HELP information. F10/CONTINUE to move forward in a procedure sequence. F12/SYSTEM FAULTS to display system faults
R – Clear	Not used for I/M testing.
S – Opt 1	This key is reserved for future use.
T – Opt 2	This key is reserved for future use.
U – Print	Not used for I/M testing.
V – Shift	Not used for I/M testing.

General Vehicle Inspection

The inspection process, prompts, and screen procedures are determined by State regulations. You must know and understand your State regulations to properly use the analyzer software.

Accessing and Aborting Tests

Entering Access Codes



Figure 1-3: Inspector Logon Prompt Screen

Access to certain menu items, including an Emissions Inspection Test, requires two codes:

- Inspector access code, and
- Inspector PIN number.

1. Scan Inspector license number.
   - — Press TAB to move from field to field.
   - — Press SHIFT+TAB to move to the previous field.
2. Enter access code.
   - — Select F10 to Continue.

✓ Logon may be unsuccessful for any of the following reasons:

- — Inspector license number was not found on file.
- — Inspector license is not valid to conduct emissions tests.
- — Inspector access code is incorrect.
- — Inspector license has expired.
- — Inspector license has been suspended or revoked.

IMPORTANT **The bar code scanner must be used to scan access codes from badges. Manual entry is not allowed.**

If the technician license or station license have expired, the analyzer does not allow access to the emissions inspection function.

Aborting an Inspection

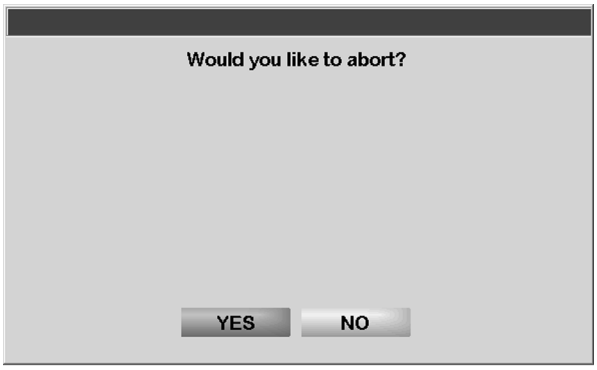


Figure 1-4: "Would you like to abort?" Prompt Screen

This section describes the procedure for aborting an inspection. If entry into the inspection functions is attempted while certain faults exist, the program aborts. Press F12 STATUS to view a list of faults.

✓ Warnings that do not affect vehicle inspection may be present during testing. These warnings concern conditions that should be addressed, but that do not affect testing.

1. Press ESC at any time to abort a test and return to the Main Menu. The analyzer displays a prompt to verify the abort, as shown in *Figure 1-4*.
   — Select NO or press ESC a second time to return to the place in the test from which the abort was attempted.
   — Select YES to abort the test.

✓ After selecting YES, in some applications an Abort Code may be required indicating the reason the test was ended. In this case, the analyzer displays a list of Abort Codes. Highlight the correct code and press Enter.

Using the Bar Code Scanner

The analyzer is equipped with a bar code scanner that is used to simplify the entry of frequently used information, including:

- Vehicle Identification Numbers (VINs),
- Vehicle sticker information, and
- Other bar coded information.



Figure 1-5: Example 1-D and 2-D Bar Codes

Figure 1-5 shows a typical bar code symbol. By arranging the bars and spaces contained in a bar code in a certain order, it is possible to represent, or "encode" letters, words, and numbers.

Bar codes contain a blank area on their left and right sides. This blank area is called a "quiet zone" and it tells the scanner where the bar code begins and ends. It is important to include these blank areas when running the scanner over the bar code.

Scanning Technique

Test the Scanner

Aim the scanner away from you and press the trigger. When you press the trigger, the scanning beam is energized for approximately 3.5 seconds (default).

Scan

1. Make sure the symbol you want to scan is within the proper scanning range.
2. Aim and press the trigger.
   — The scan beam and red SCAN LED light for about 3.5 seconds, or until a successful "read" or decode is achieved.
3. The scanner has read the symbol successfully when:
   — You hear a "beep," and
   — The green DECODE LED lights. This LED stays green until the next trigger pull, or until power is removed from the scanner.

Before attempting a scan, make sure the bar code is of good quality and that the bar code scanner's scanning window is clean. Dirt and specks can cause inaccurate scans, as can wrinkled or smudged bar codes.

Scanning Tips

Hold the Scanner at an Angle

Do not hold the scanner directly over the bar code. In this position, light can bounce back into the scanner's exit window and prevent a successful "read" or decode.

Scan the Entire Symbol

- Your scan beam must cross every bar and space on the symbol.
- The larger the symbol, the farther away you should hold the scanner.
- Hold the scanner closer for symbols with bars that are close together.
- A short high-tone “beep” indicates a good decode.

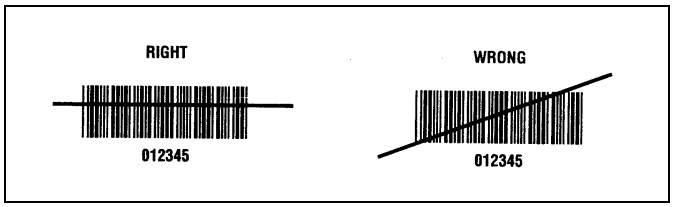


Figure 1-6: Right and Wrong Ways to Scan a Bar Code

Storing the Scanner

When not in use, store the scanner in the small holster on the side of the analyzer.

Software Overview

The analyzer software leads the operator step-by-step through test functions. All analyzer functions display on the monitor and are controlled by the keyboard and the mouse. A remote control is available for use with the ***OBIS*** program. The basic operation of the analyzer is menu-driven. See *Main Menu, page 1-23*.

Relevant information displays concisely using the full capacity of the primary screen, specific HELP screens, and operator prompts. See:

- *Powering Up the Analyzer, page 1-18*
- *Inspection Mode, page 1-18*
  - — *Access, page 1-18*
- *PC Mode, page 1-19*
  - — *Access, page 1-19*
  - — *Exit, page 1-19*
- *System Security, page 1-19*
- *Monitor Screens, page 1-20*
  - — *Menus, page 1-20*
  - — *Prompts, page 1-21*
  - — *Data Entry Screens, page 1-21*
  - — *HELP Screens, page 1-22*
- *Main Menu, page 1-23*
- *Software Flowchart, page 1-25*

Powering Up the Analyzer

1. Turn ON the main power switch located on the back of the analyzer.
   — The ***Windows*** Password Access Screen displays.

✓ The telephone cord must be connected at all times to the appropriate telephone connection at your site, using the phone cable provided with the analyzer.

2. Enter the required operating mode.
   — Inspection, for emissions testing, or
   — PC, for normal PC use without emissions testing.

Inspection Mode

Access

1. Power up the analyzer.
2. Type "obis" in the ***Windows*** User Name field and select OK.
   — The system launches the ***OBIS*** inspection software.

✓ No password is required.

System Faults or Warnings in the *OBIS* Inspection Program
The System Status Screen lists any fault(s) detected during power-up system checks. These faults display in the lower right section of the screen.

Exit



1. Select the End button on the bottom of the Inspection screen and follow the prompts.
2. To completely shut down the system, select "Shut down" from the ***Windows*** drop down menu.
3. When the monitor screen is blank, turn OFF the main power switch located on the back of the analyzer.

PC Mode

Use the analyzer in a normal PC and function as normal PC-compatible system. The user must exit the *OBD II* software to enter PC mode. To place the analyzer into PC Mode:

1. Go the Main Menu.
2. Select End Shutdown/PC Option.

✓ For additional information refer to *User PC Function, page 1-8*.

Access

1. Power up the analyzer.
2. Type "PC" in the ***Windows*** User Name field and select OK.
   — The system launches the ***Windows*** PC software without emissions testing.

✓ No password is required.

System Security

The analyzer can detect tampering. The tamper condition is identified by the program and recorded on the hard drive. Only State or service personnel can remove the tamper condition and return the analyzer to operation.

IMPORTANT

- **Never attempt to modify I/M test data.**
- **Never attempt to access the I/M operating program.**
- **Never open the PC case.**
- **Always power down properly.**

Monitor Screens

The information needed to operate the analyzer appears on the monitor display screens. There are several different types of screens that display on the monitor:

- Menus
- Prompts
- Data Entry Screens

Menus

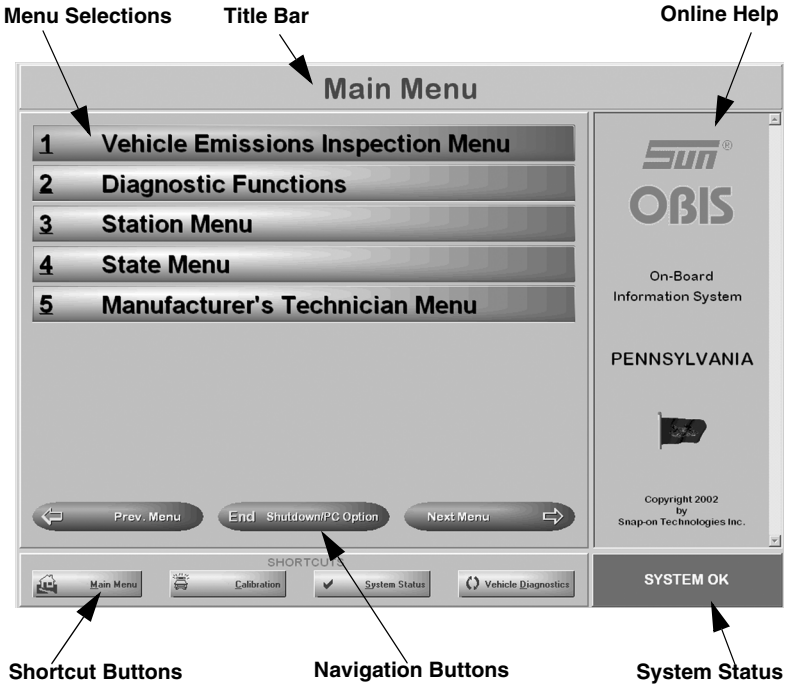


Figure 1-7: Example Analyzer Menu Screen

Menu screens are divided into the major areas, described in this section. See *Figure 1-7*.

Menu Selections	Use to select a function.
Title Bar	The area contains the menu name, test name or current function.
On-line HELP Area	On-line HELP for the current screen function displays in the top right-hand portion of the screen.
System Status Area	The current status of the system—including any current error messages—displays in the bottom right-hand portion of the screen.
Navigation Buttons	The Previous and Next buttons to navigate through screens as well as the End button used to exit the analyzer program and operate in PC mode are in the bottom of the screen.
Shortcut Buttons	These buttons are "quick clicks" to four commonly used functions: • Main Menu, • Missing or Voided Certificates, • Calibration, and • Vehicle Diagnostics.

Prompts

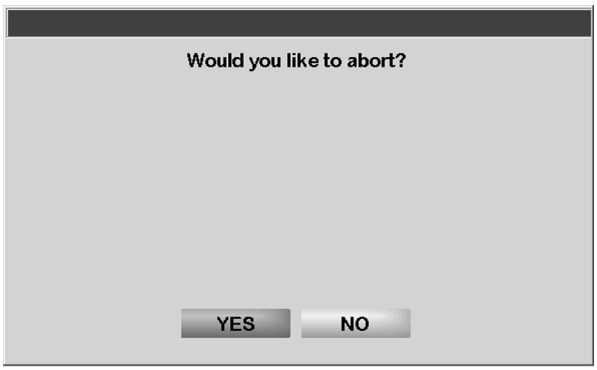


Figure 1-8: Example Prompt Screen

Prompt screens require an answer to a question or to confirm an action. See *Figure 1-8*.

— Select the buttons to respond or press Enter to execute the active button.

Data Entry Screens

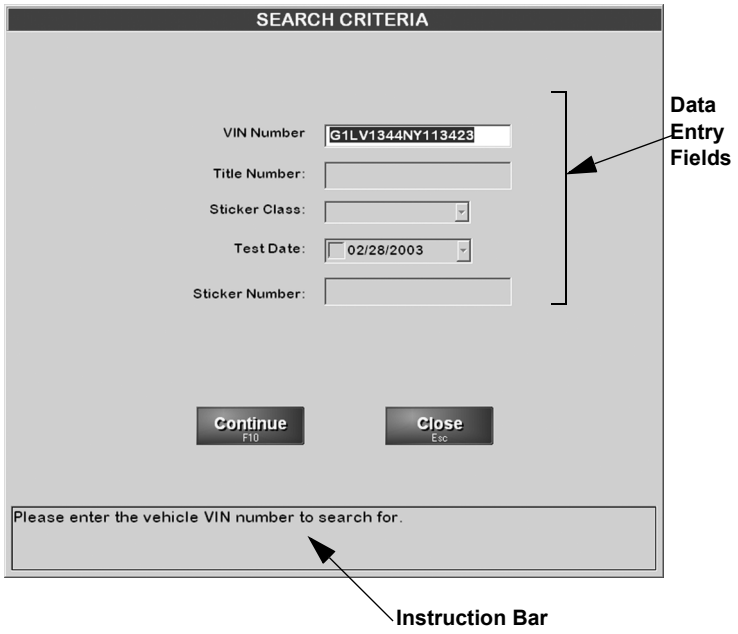


Figure 1-9: Example Data Entry Screen

Data entry screens require information to be entered into fields. See *Figure 1-9*.

— To move forward in a procedure sequence, select Continue with the mouse or press F10 on the keyboard.

— To abort a procedure, select Abort or press ESC on the keyboard.

HELP Screens

When additional instructions or explanations of test functions are available, the HELP key is highlighted.

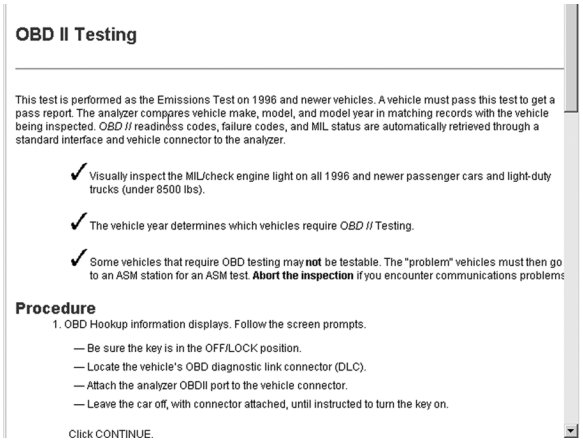


Figure 1-10: Example HELP Screen

There are two types of HELP.

- **System-wide HELP** provides general messages based on the major function currently in use, such as Calibration or Main Menu. See *Figure 1-10*.
- **Emissions Test HELP** provides detailed information for most data entry inputs required by the operator.

Main Menu

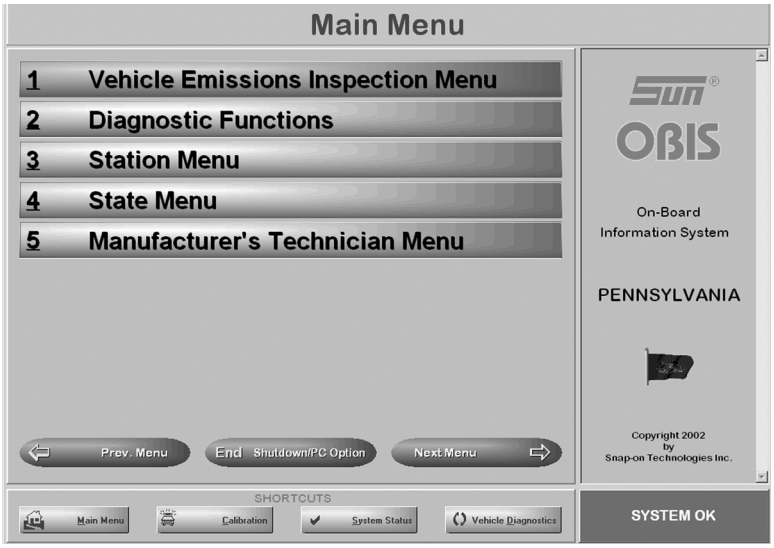


Figure 1-11: Main Menu

Select an inspection type or menu to be accessed from the analyzer Main Menu. See *Figure 1-11*.

1 Vehicle Emissions Inspection Menu

- Use to perform the emissions test on vehicles.

✓ The word "emissions" is used in this manual to refer to an *OBD II* Test. The State refers to *OBD II* testing as "emissions" testing.

2 Diagnostic Functions

- Use to access various diagnostics tests including:
  - — ***Snap-Link*** feature for a screen that allows you to connect a ***Snap-on*** scanner to the PC.
  - — *OBD II* Test to diagnose vehicle emissions problems.
  - — Barcode Reader Test verifies that the
  - — Gas Cap Integrity Test

✓ The scanner must be a ***Snap-on*** scanner.

✓ Follow the instructions in the ***Snap-Link*** manual for operation of the software.

3 Station Menu

- Print Sticker Used Report
  - — Use to display and print a report of stickers used at the station)
- Network Communication Diagnostics
  - — Modem Diagnostics
  - — Dial Tone Check
  - — Network Diagnostics
- Data File Refresh
  - — File transfer and screen prompts during data file refresh.
- Previous Vehicle Inspection History
  - — After gathering some vehicle information VIID access will be attempted and, if successful, the equipment will request the production of a report.
- Print Communications Log
  - — Print to the VIR printer a text listing of all communications session logs recorded by the equipment for a minimum of the past 100 communication sessions.
- Test Record Search and Retrieve
  - — Display of inspection records, the search and retrieval of previous test records.
- Request Lockout Status
  - — Upon selection, VIID access will be attempted and, if successful, the VIID will return the revised lockout status even though the lockout might not have been removed.
- Emergency Software Update
  - — Used with software disk to update analyzer.
- Remote Software Update
  - — Used to access ***Snap-on*** Remote Update Server.

4 State Menu

- Used by the State auditor to verify that the analyzer is functioning properly.
  - — DO NOT attempt to access this menu or a Lockout could occur.

5 Manufacturer's Technician Menu

- Used by analyzer service technicians only.
  - — DO NOT attempt to access this menu or a Lockout could occur.
  - — Resuming analyzer operations after a lockout requires a service visit. Do not attempt to access Manufacturer's Technician Menu.

Software Flowchart

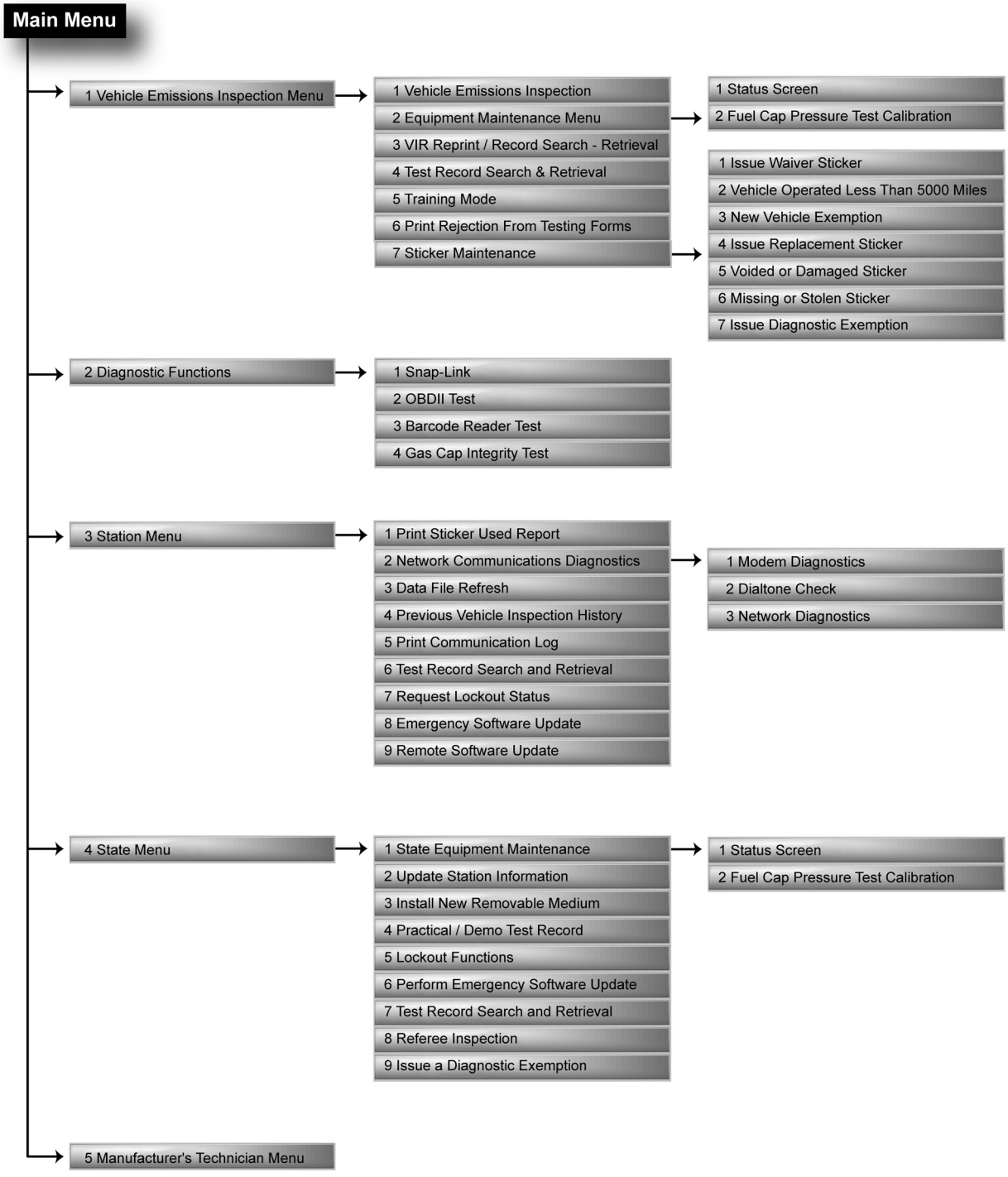


Figure 1-12: Software Flowchart

2 Vehicle Emissions Inspection

This chapter contains information about the inspection process using the Vehicle Emissions Inspection Menu including:

- *Test Types, page 2-1*
- *Vehicle Data Entry, page 2-2*
- *Fuel Cap Test, page 2-12*
- *OBD Test, page 2-16*
- *After Repairs Tests, page 2-23*

Test Types

Determine the type of test to perform on a vehicle by identifying the county in which the vehicle is registered. The following overview of counties identifies test type for those specific counties:

≥1996 OBD /Gas Cap **1975–1995 Gas Cap & Visual**	• Berks • Cumberland • Dauphin • Lancaster • Lebanon • Lehigh • Northhampton • York
GasCap & Visual	• Blair • Cambria • Centre • Erie • Lackawanna • Luzerne • Lycoming • Mercer
1996 & Newer - Added OBD	• Pittsburgh/Philadelphia

Vehicle Data Entry

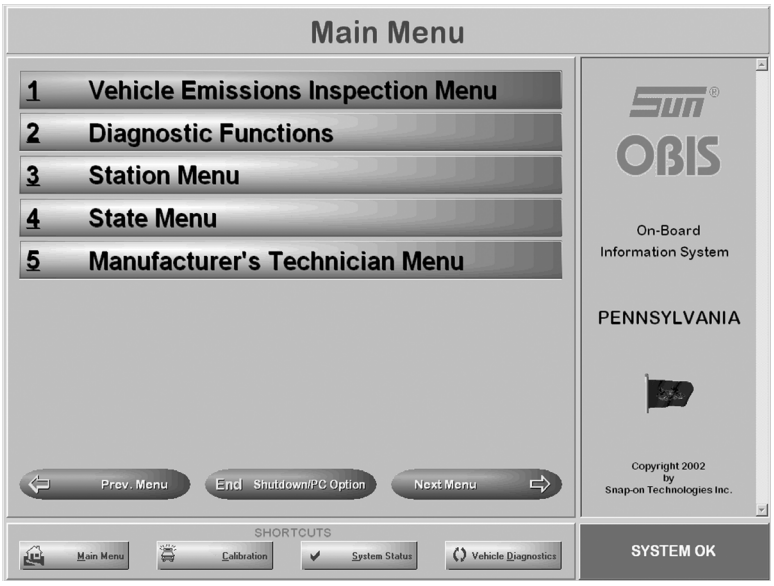


Figure 2-1: Main Menu

1. Select Vehicle Emissions Inspection from the Main Menu.



Figure 2-2: Inspector Logon

2. Scan Inspector license number.
   - — Press TAB to move from field to field.
   - — Press SHIFT+TAB to move to the previous field.

✓ License number and access code may also be entered manually.

✓ License number consists of two (2) alpha characters followed by six (6) numbers.

✓ Access code consists of five (5) numbers.

3. Enter access code.
   - — Select F10 to Continue.

✓ Logon may be unsuccessful for any of the following reasons:

— The Inspector license number was not found on file.
— The Inspector license is not valid to conduct emissions tests.
— Inspector access code is incorrect.
— Inspector license has expired.
— Inspector license has been suspended or revoked.

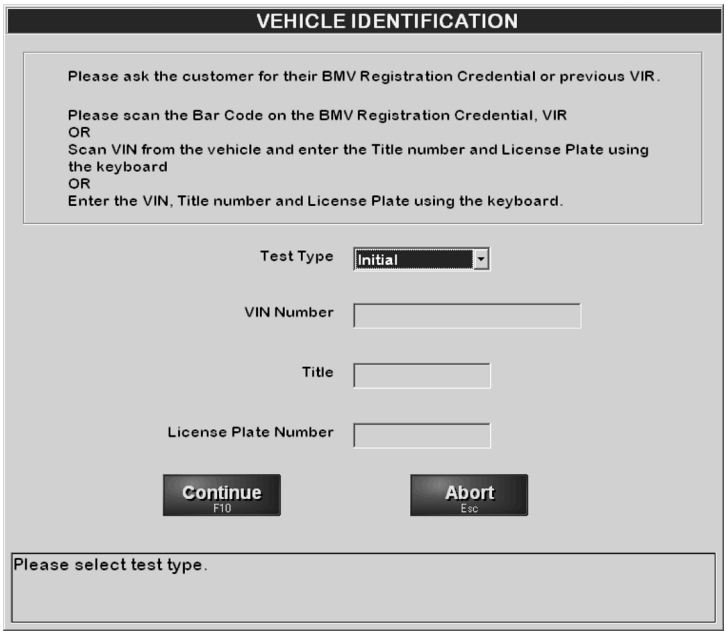


Figure 2-3: Vehicle Identification

4. Ask the customer for BMV Registration Credential or previous VIR.

✓ Use the barcode for faster testing.

5. Select the Test Type:
   — Initial, or
   — After Repairs
   Press Tab or Enter.
6. Scan the barcode on the BMV Registration Credential, the VIR, the VIN on the vehicle or enter VIN Number and press Tab or Enter.
   — If the VIN is entered manually, a second entry is required.
   — If the VIN entered has more than 17 characters you are asked to check the VIN number and re-enter manually.

✓ Scanning is the fastest and preferred method for data entry.

7. Enter Title Number and press Tab or Enter.

✓ Title Number must be between 5 and 10 characters long.

8. Enter License Plate Number and select F10 to Continue.

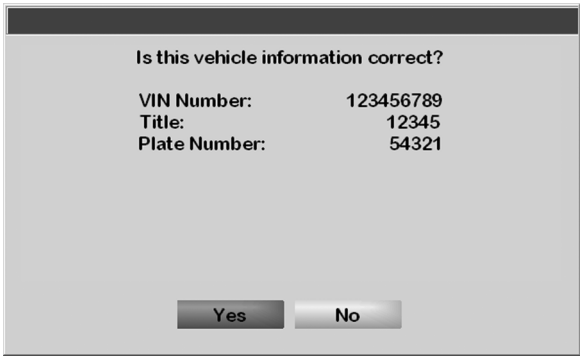


Figure 2-4: Verify Vehicle Information

9. A review screen displays. Verify that the information is correct and select:
   Yes, if vehicle information is correct
   — The analyzer contacts the VID for a vehicle match. See *Figure 2-5*.
   No, if vehicle information is incorrect.
   — The Vehicle Identification screen displays. Correct information and select F10 to Continue.

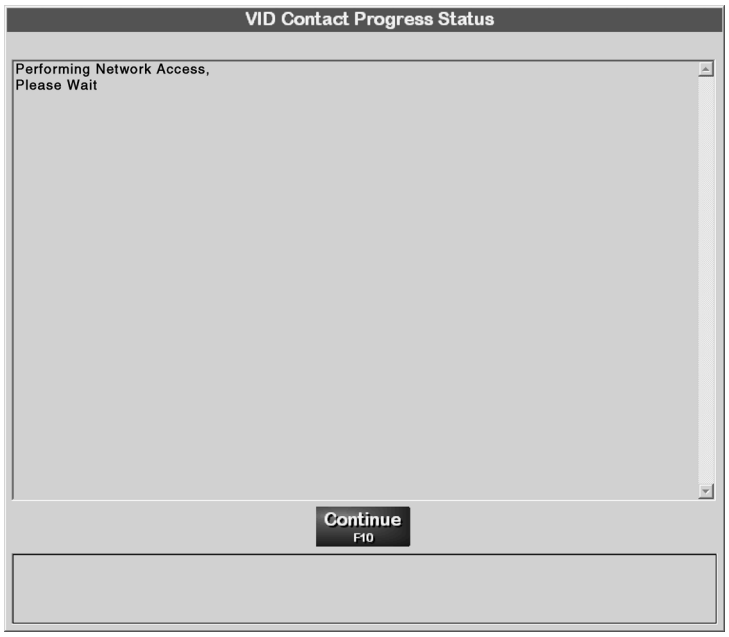


Figure 2-5: VID Contact

10. The analyzer contacts the VID. Select F10 to Continue.

✓ If the VID cannot be contacted, an error message displays.

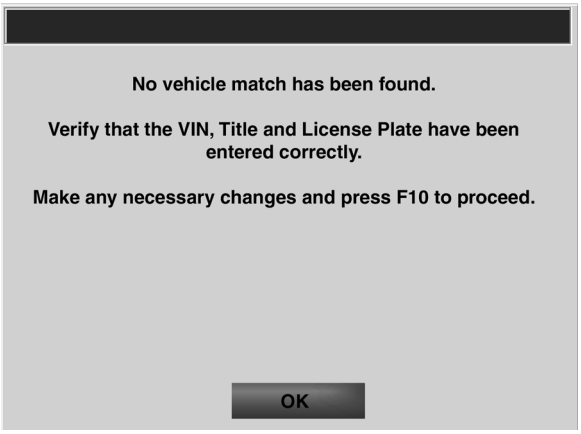


Figure 2-6: No Vehicle Match, Check Entries



Figure 2-7: Verify Vehicle Information

✓ If no vehicle match is found on the VID, the message in *Figure 2-7* displays. Select Continue (F10) to proceed.

✓ If the analyzer cannot contact the VID after two attempts the following message displays and emissions testing continues:

CANNOT ACCESS NETWORK. PROCEED WITH THE EMISSIONS TEST.

✓ There is a limit to the number of test that may be performed without connecting to the VID. When that limit is reached the following message displays:

COMMUNICATION SECURITY VIOLATION. TOO MANY EMISSIONS TESTS WITHOUT COMMUNICATING TO THE VID. THE INSPECTION CANNOT PROCEED, CONTACT PENNDOT SUPPORT.

✓ If no vehicle matching the VIN, Title Number and License Plate is found on the VID, the message in *Figure 2-6* displays. Check the data entered, make the necessary changes and press F10 to CONTINUE.

Vehicle Found on the VID

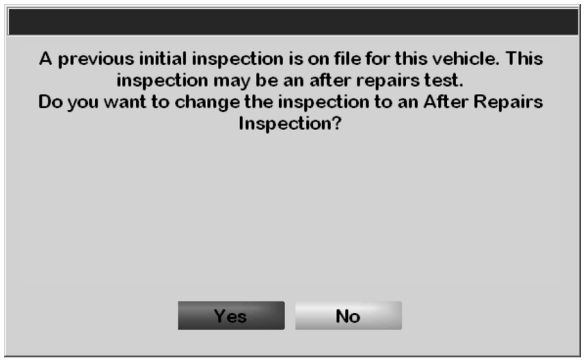


Figure 2-8: VID Contact

✓ If a previous initial inspection is on file for the vehicle you are asked if you want to qualify the inspection as an After Repairs Inspection. Select:
- — Yes, to change to After Repairs Inspection, or
- — No, to continue with an Initial Inspection,

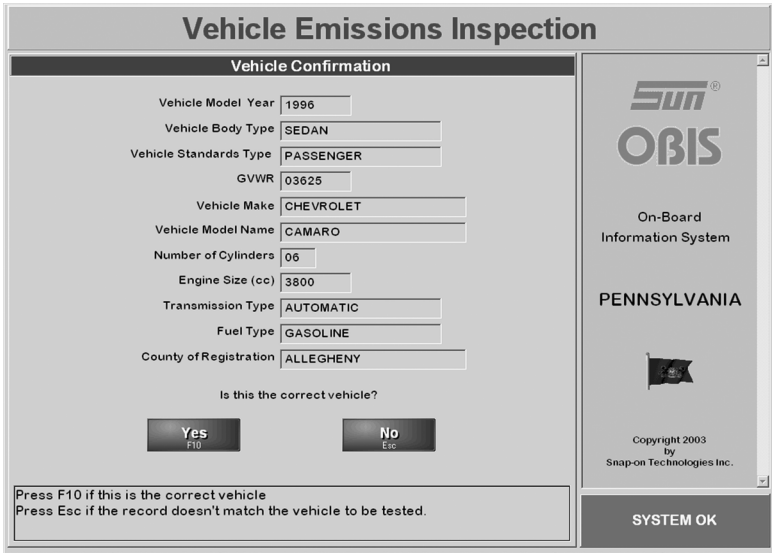


Figure 2-9: Vehicle Found, Confirmation

11. If the vehicle is found on the VID, the Vehicle Confirmation screen displays completed with all information available from the VID.
    - — Confirm that all information is correct and select Yes (F10) to Continue.
    - — Select No (Esc) if the vehicle information is incorrect.

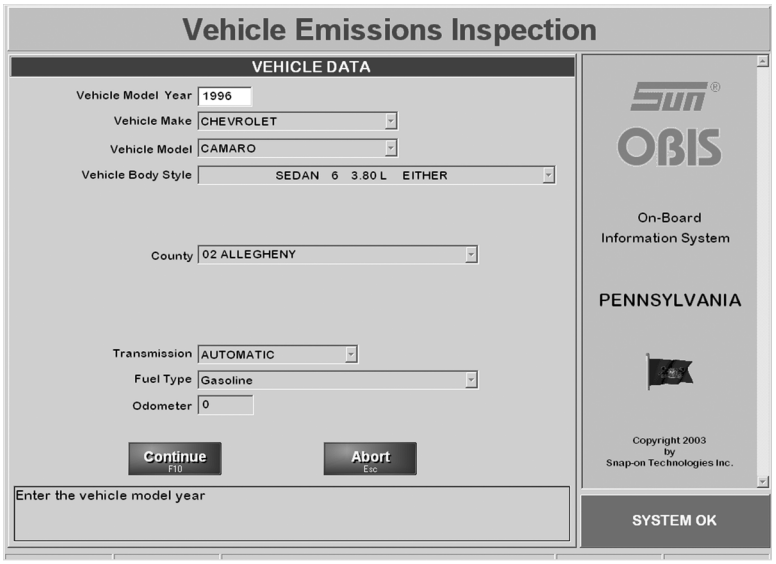


Figure 2-10: Vehicle Data

12. Verify that the information in the Vehicle Data screen is correct.
    - — If necessary, enter the necessary vehicle information changes using the keyboard and dropdown menus. See *Figure 2-10*.
13. Enter the Vehicle Model Year and press Enter.

✓ The Vehicle Year and County selection determine the test type performed.
- — Visual
- — Visual and OBD
- — Other

14. Press Enter to accept the Vehicle Make retrieved from the VID.
    - — If the Vehicle Make is incorrect, select the drop down and choose the Vehicle Make from the display list. Press Enter to Continue.

✓ If the vehicle is not on the list, select "Other" from the end of the list.

15. Press Enter to accept the Vehicle Model retrieved from the VID.
    - — If the Vehicle Model is incorrect, select the drop down and choose the Vehicle Model from the display list. Press Enter to Continue.

✓ The analyzer contains a lookup table for various vehicle makes and models. This list may not apply to "newer" vehicles.
- — To access the list, type the first few letters of the make or model or press Enter. Use the arrow keys to move through the list that displays. Either select the model from the list or type in the model name.

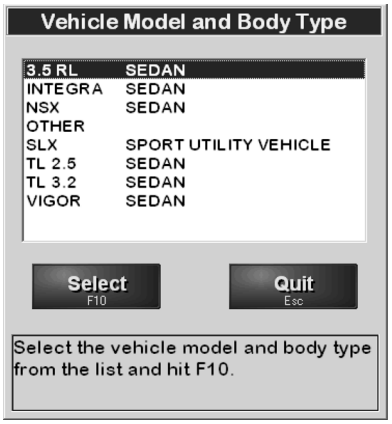


Figure 2-11: Vehicle Model and Body Type List

16. Enter the Vehicle Body Style and press Enter. Options are:
    - 1 = Sedan
    - 2 = Station Wagon
    - 3 = Pickup
    - 4 = Sport/Utility Vehicle
    - 5 = Minivan
    - 6 = Full-Size Van

17. If requested, enter the Gross Vehicle Weight and press Enter.

✓ No test is performed if the GVW entered is less than 2,500 lbs or greater than 9,000 lbs.

✓ GVWR does not display if sedan or station wagon are selected.

If GVWR entered is:
- Greater than 8,500 lbs and the model year is 1996 or newer, the analyzer conducts an *OBD II* Test.
- Less than or equal to 6,500 lbs and the model year is 1996 or newer, the analyzer performs an *OBD II* Test.
- GVW for passenger cars must be no less that 1,700 lbs and no greater that 6,000 lbs.

18. Select the County in which the vehicle resides. To display the County in the entry field:
    - Type the first letter of the county in the County field, or
    - Scroll the list and select the county.

✓ The State has varying test requirements that include Visual Inspection only, TSI/OBD, ASM/OBD and OBD only. Another analyzer is required to perform TSI and ASM Tests.

19. Select Fuel Type and press Enter. Options are:
    - G = Gasoline
    - B = Bi-Fueled (Dual-Fueled)

    If the vehicle is dual fueled, the following message displays:

YOU HAVE INDICATED THAT THIS VEHICLE IS DUAL FUELED. PLEASE CONFIRM THAT THE VEHICLE IS OPERATING ON GASOLINE FOR THE TEST BY SELECTING "YES"

Select Yes and press Enter.

— D = Diesel (Not applicable)
If the vehicle is diesel fueled, the following message displays:

YOU HAVE INDICATED THAT THIS VEHICLE IS DIESEL FUELED. PLEASE CONFIRM THAT THE VEHICLE IS OPERATING ON DIESEL BY SELECTING "YES"

Select Yes, press Enter and the test ends. Vehicles fueled by diesel do not require testing.

20. Enter the Odometer Reading and select Continue (F10).

✓ Do not enter tenths of miles or decimal points.

21. If the system found a match, the Vehicle Confirmation Screen displays asking if it is the correct vehicle. Select:
    — Yes (F10) to CONTINUE, or
    — No (Esc) if the vehicle is incorrect and manually enter the vehicle information.

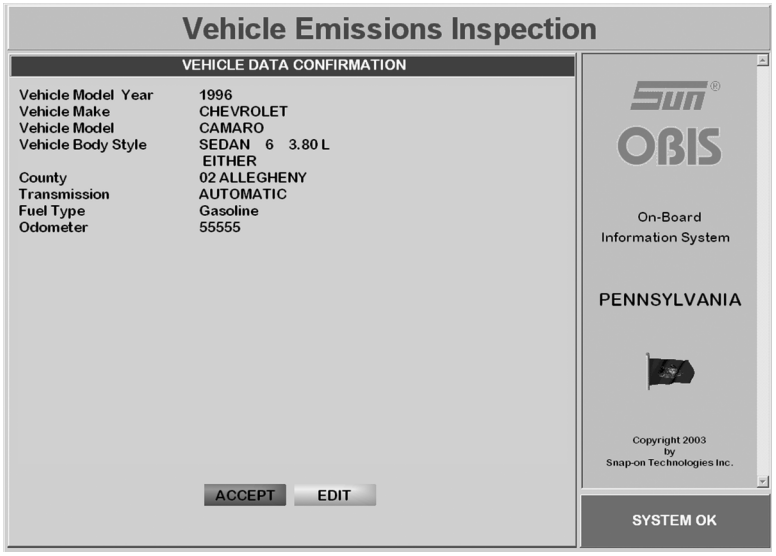


Figure 2-12: Vehicle Data Confirmation

✓ If the vehicle VIN, Title Number and License Plate is found on the VID, the screen in *Figure 2-12* displays.

22. After all data is entered and validated, a review screen displays. See *Figure 2-12*. Review the information and if correct, select:
    — ACCEPT to Continue, or
    — EDIT to BACK-UP and make corrections.

Vehicle Not Found on the VID

Vehicle information must be entered before performing a test If no vehicle match is found on the VID.

✓ See *Vehicle Found on the VID, page 2-6* for additional data entry instructions.

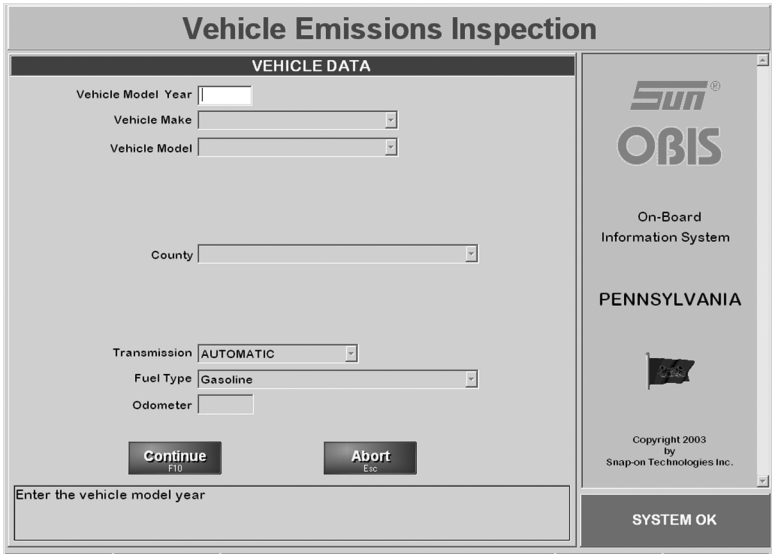


Figure 2-13: Vehicle Data

1. Enter the necessary vehicle information using the keyboard and dropdown menus. See *Figure 2-13*. Select Continue (F10) to proceed.

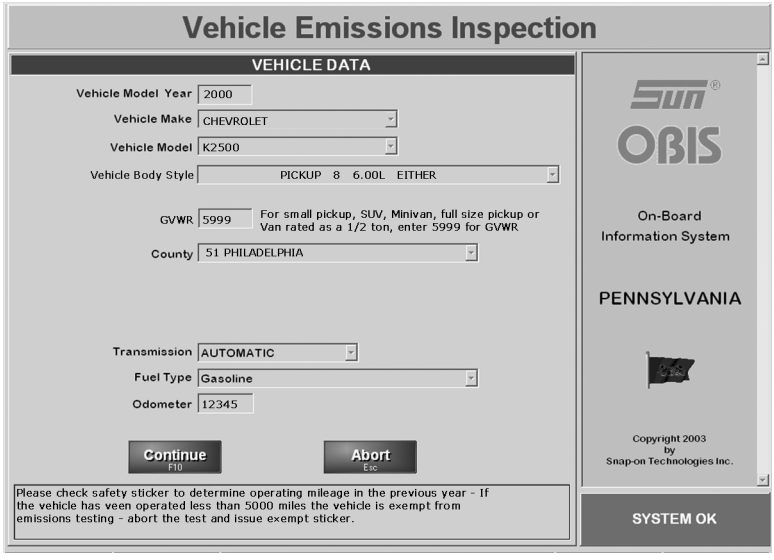


Figure 2-14: Vehicle Data

2. As information is entered, new information may display on the screen for completion (i.e., Vehicle Body Style) as shown in *Figure 2-14*.

✓ Trucks require weight entry.

✓ Press the first letter of the Make and Model to find a match.

✓ Selecting a Fuel Type other than gasoline automatically aborts the test.



Figure 2-15: Vehicle Data Confirmation

3. A verification screen displays. Review all information to be sure it is correct.
   — If correct, select ACCEPT to Continue.
   — If not correct, select EDIT to return to the Vehicle Data screen (*Figure 2-14*).

4. Gas Cap Test begins. See *Fuel Cap Test, page 2-12*.

Fuel Cap Test

A Fuel Cap Pressure Test Calibration must be performed within 72 hours of Vehicle Emissions Inspection testing. See *Gas Cap Integrity Test, page 5-5* **for testing procedure.**

1. Depending on the County of Registration (see *page 2-1*), you may be required to perform a Visual Inspection with the Gas Cap Test.
   — The Vehicle Year also determines the test type.

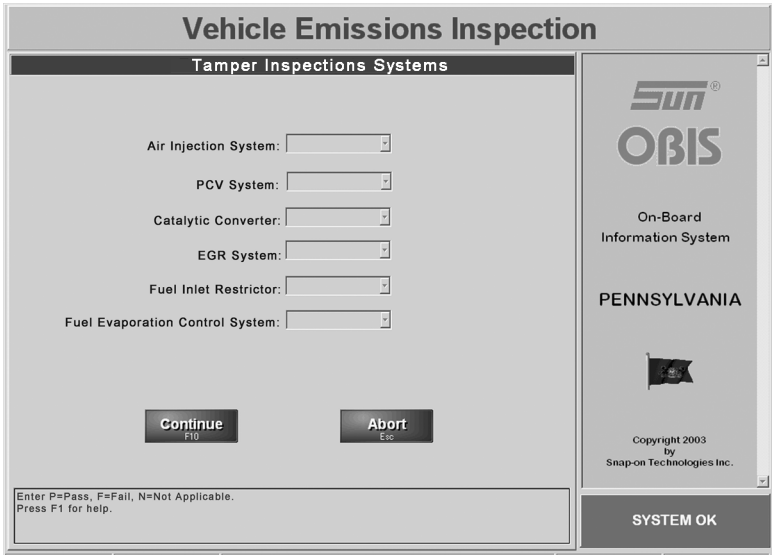


Figure 2-16: Tamper Inspection Systems

2. When the screen shown in *Figure 2-16* displays, answer each question with one of the following:
   — P = Pass
   — F = Fail
   — N = Not Applicable

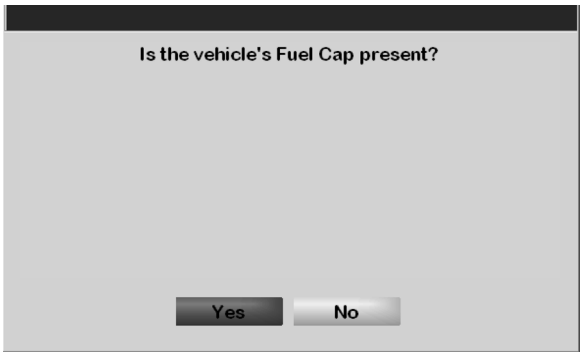


Figure 2-17: Fuel Cap Present?

3. Select Yes and press Enter if the fuel cap is present.
   — If the cap is not present, the test fails.

✓ It is suggested that if the fuel cap is missing, a new cap is installed prior to testing.

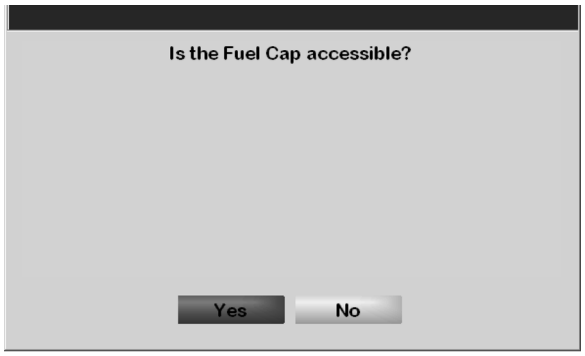


Figure 2-18: Fuel Cap Accessible?

4. Select Yes to proceed if the fuel cap is accessible.
   — If the cap is not accessible, the vehicle fails the test.

✓ Gas caps must be tested.

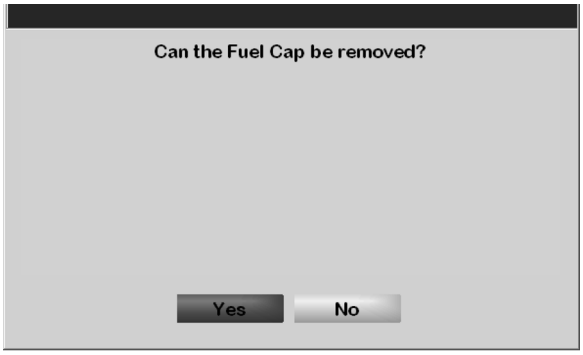


Figure 2-19: Fuel Cap Removable?

5. Select Yes to proceed if the fuel cap can be removed.
   — If the cap can not be removed, the vehicle fails the test.



Figure 2-20: Fuel Cap Fit Standard Adapter?

6. Select Yes to proceed if the fuel cap fits a standard adapter.
   — If the cap does not fit a standard adapter, the Gas Cap Test is skipped.



Figure 2-21: Turn Ignition Key OFF

7. Be sure the ignition key is in the off position and select Continue (F10) or Enter to proceed.

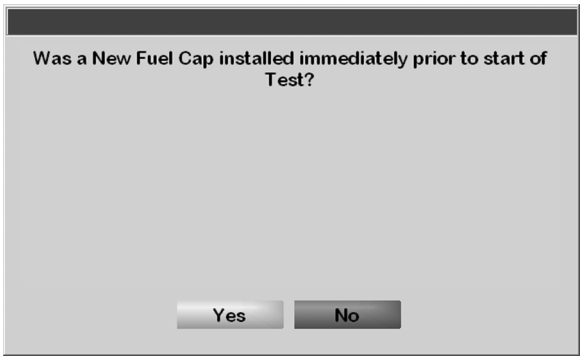


Figure 2-22: New Fuel Cap Prior to Test?

8. Determine if a new fuel cap was installed immediately prior to the start of the test and select Yes or No.
   — If the fuel cap was replaced due to a customer request and the cap fails the test, there is another opportunity to test the cap before declaring the test Failed.

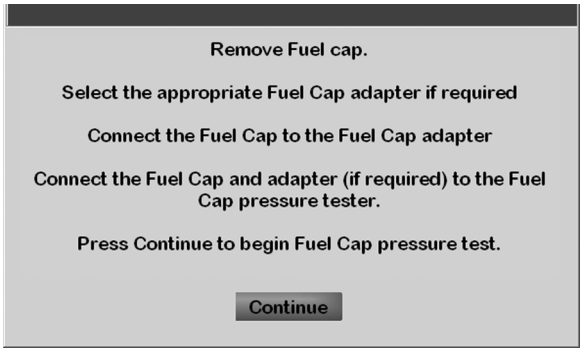


Figure 2-23: Remove Fuel Cap

9. Select a fuel cap adapter, if required, and connect to the fuel cap.
   — Connect the fuel cap and adapter to the fuel cap pressure tester.
   — Select Continue to proceed with the Fuel Cap Test.

   The following messages display and the Gas Cap Test automatically proceeds:

   INITIALIZING GAS CAP TESTER.
   READY TO TEST.

✓ Use the remote to continue if at the rear of the vehicle.

10. The following message displays:

    GAS CAP TEST IN PROGRESS...

11. The gas cap tester beeps when testing is complete and one of the following messages display:

    TEST COMPLETE - PASSED!

    TEST COMPLETE - FAILED!

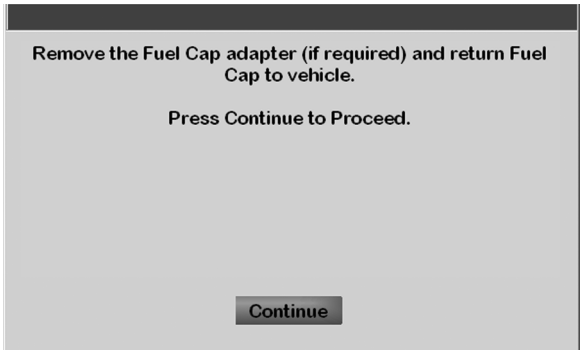


Figure 2-24: Return Fuel Cap Adapter

12. Remove fuel cap adapter and return the fuel cap to the vehicle.
    — Select Continue to proceed.

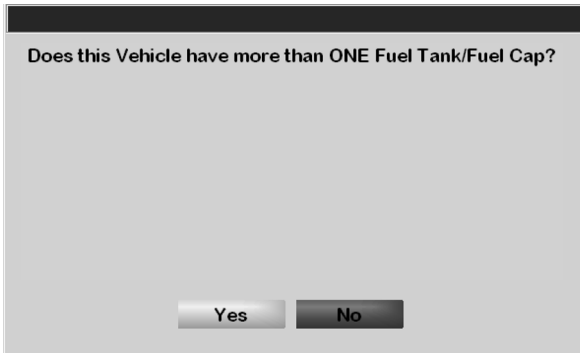


Figure 2-25: More than One Fuel Tank/Fuel Cap?

13. Select No to proceed if the vehicle does not have more than one fuel tank/cap.

✓ If Yes is selected, both caps must be tested and the Gas Cap Test is repeats for the second cap.

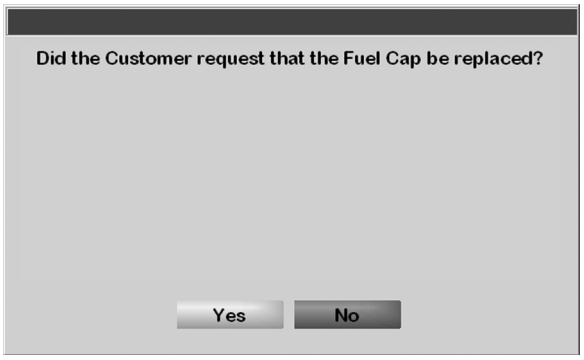


Figure 2-26: Did Customer Request Fuel Cap Replacement?

14. If the fuel cap fails the test, you are asked if the customer requested that the fuel cap be replaced. Select Yes or No.
    — If No is selected, the vehicle fails the test.

✓ If one cap in a multiple set fails, all fuel caps fail.
    — If a cap is replaced prior to during testing, information entered for that cap remains in the system when additional fuel caps are tested during the inspection.

OBD Test

After the Gas Cap Test, the *OBDII* Test follows.

✓ This section includes detailed *OBDII* Test instructions. For introductory *OBDII* information see:
    — *Key Terms, page A-1*,
    — *The Data Link Connector (DLC), page A-5*,
    — *OBD System Testing, page A-14*,
    — *OBDII Connections, page A-18*.

✓ This test is only performed if the vehicle model year is 1996 and newer and is registered in an OBD county.
    — If the vehicle type is "T" (Truck) and the GVWR is equal to or greater than 8501 lbs and less than 9000 lbs, the program prints a Rejection From Inspection Form containing the vehicle information.

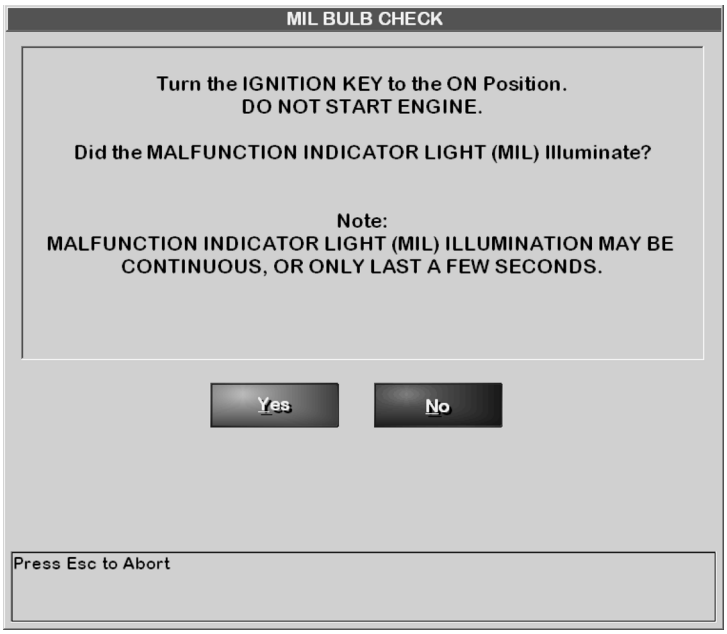


Figure 2-27: MIL Bulb Check

1. Locate the MIL light and observe carefully. See *The Malfunction Indicator Lamp, page A-17*. Turn the key on and check the light. Did the MIL turn on? Select:
   — Yes, **came** on.
   — No, **did not** come on.

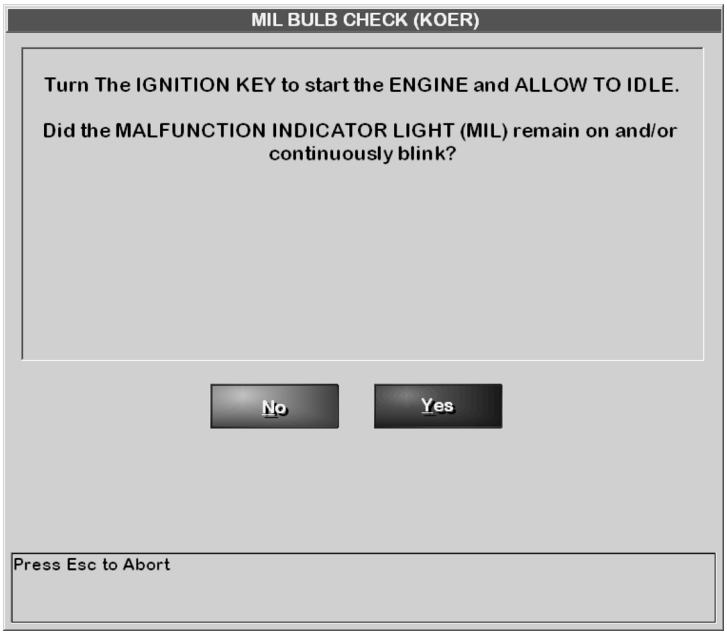


Figure 2-28: MIL Bulb Check

2. Start the engine and allow to idle. Wait approximately 10–12 seconds. Verify the MIL light goes out.
   — No indicates the light turned off.

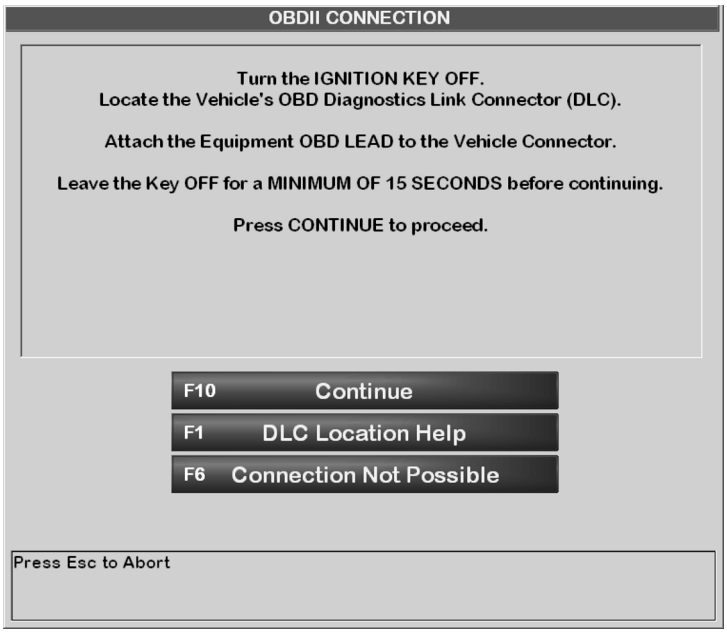


Figure 2-29: OBDII Connection

3. OBD Hookup information displays. See *Figure 2-29*. Follow the screen prompts.
   - — Be sure the ignition key is off.
   - — Locate the vehicle's OBD diagnostic link connector (DLC).
   - — Attach the analyzer OBD lead to the vehicle connector.
   - — Leave the key off for 15 seconds with connector attached.

✓ Never connect to the vehicle until instructed to do so.

✓ Press F1 to see a diagram of common connection locations and press Esc to exit, or see *Figure A-10, page A-18*.

Select Continue (F10) when ready to proceed. Follow the procedure in *OBD Testing Begins, page 2-19*.

✓ If the OBD lead cannot be connected to the vehicle, select Connection Not Possible (F6) and follow the procedure in *OBD Connection Problem, page 2-19*.

OBD Connection Problem

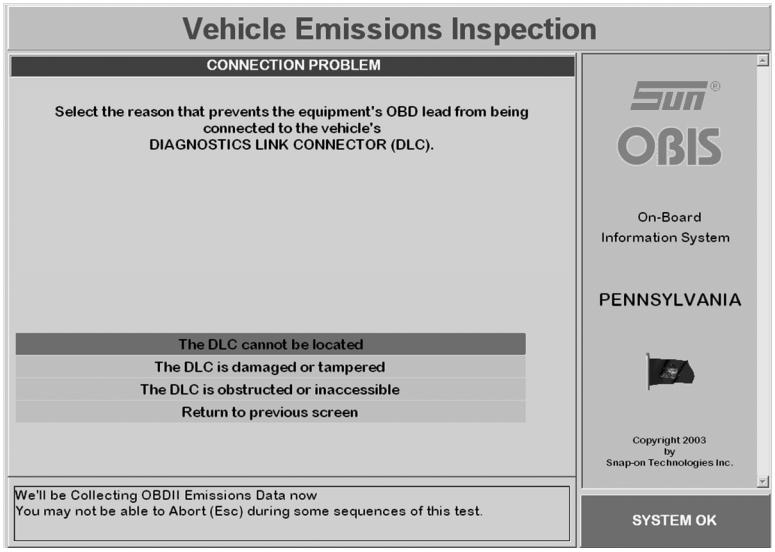


Figure 2-30: OBD Connection Problem

A reason must be identified if the vehicle can not be connected for testing. Use the screen shown in *Figure 2-30* to select the reason for the vehicle cannot be connected.

- ✓ If the Connection Problem screen was accessed in error, select "Return to previous screen" and continue testing.
- ✓ OBD must be tested. The vehicle fails the test when any of the choices on the Connection Problem screen are selected.

OBD Testing Begins

- ✓ Once started, the OBD Test can not be aborted.

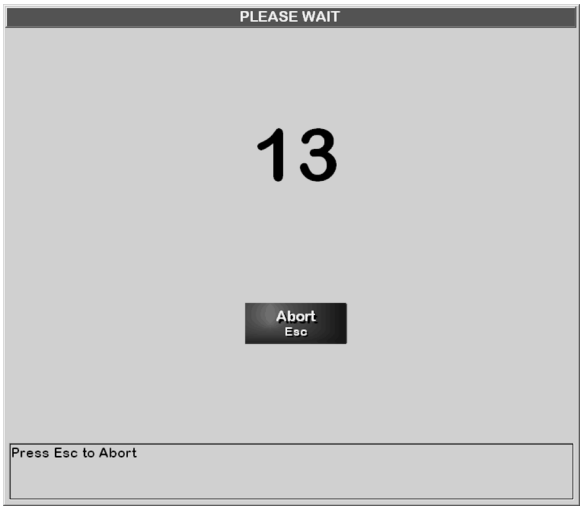


Figure 2-31: Communication Countdown

4. A countdown screen displays while the analyzer checks communication with the vehicle.

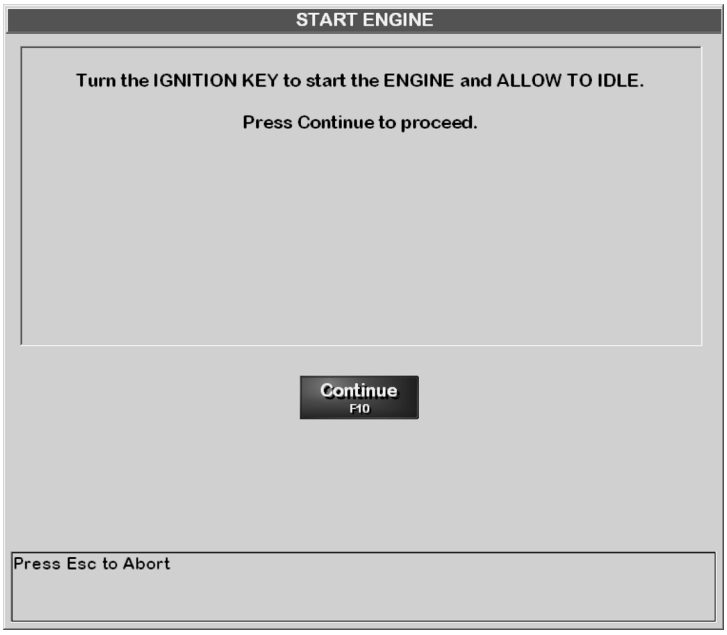


Figure 2-32: Start Engine

5. Start the engine and allow it to idle. Press Continue (F10) to proceed.

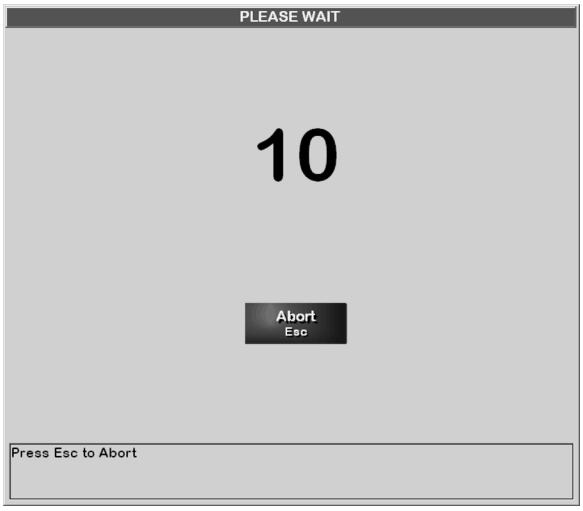


Figure 2-33: Idle Countdown

6. A countdown screen displays while the analyzer collects OBDII emission data.
7. Wait while the following message displays:

COLLECTING DATA
PLEASE WAIT



Figure 2-34: OBDII Comm Problem

8. If communication can not be established during data collection, the screen in *Figure 2-34* displays.
   — Recheck connections, select Retry and repeat the procedure.
   — Select Continue with No OBD to end the test if communication remains unsuccessful.

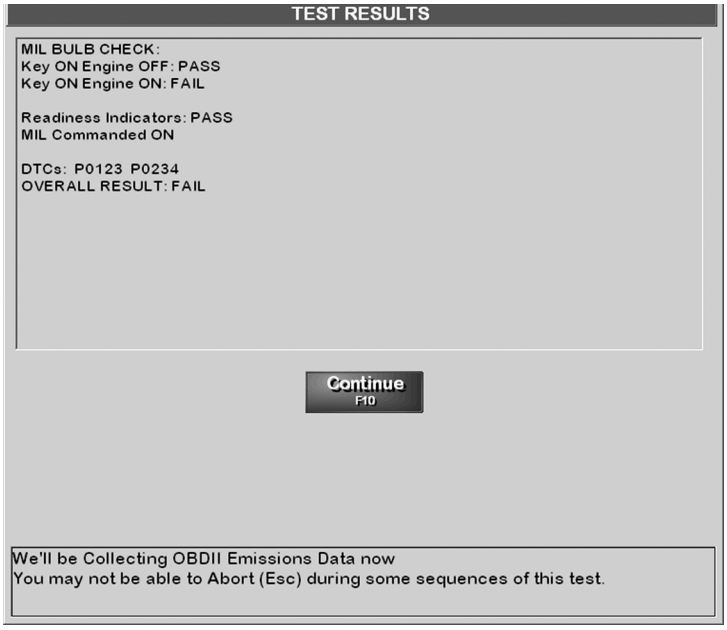


Figure 2-35: Test Results

9. When the test is complete a report displays showing the results of the test. See *Figure 2-35*.

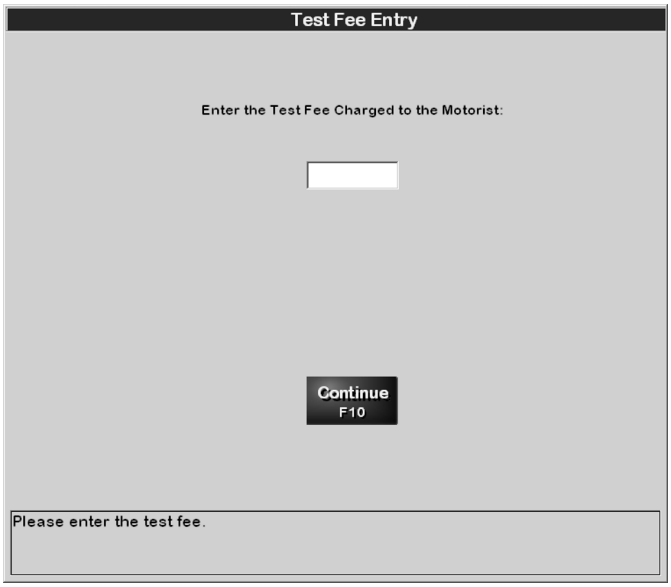


Figure 2-36: Test Fee Entry

10. At the end of the OBD Test, the Test Fee Entry screen shown in *Figure 2-36* displays.
    — Enter the test fee, in dollars and cents (example: 21.00), the motorist is being charged.

11. Next, one of two possibilities occurs:
    — The analyzer contacts the VID and transmits test results to the host, **or**
    — You are prompted to enter a sticker/decal number for passing vehicles.

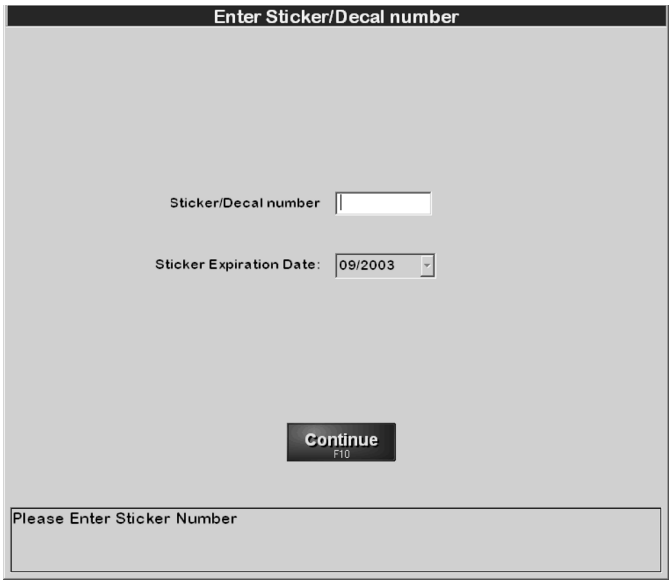


Figure 2-37: Sticker/Decal Number

12. If the vehicle passed the test, enter the next sticker number.
    — Enter the sticker number expiration date if different from the default date that displays, or if instructed to correct the date.

13. The analyzer contacts the VID.

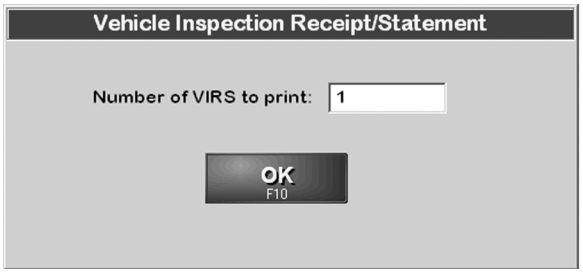


Figure 2-38: Number of VIRS to Print

14. After contacting the VID, select the number of Vehicle Inspection Reports (VIR) to print and press F10 to print the reports.

✓ Make sure the printer is ready to print.

After Repairs Tests

After repairs inspections are required for vehicles that failed their initial inspection and have returned after obtaining vehicle repairs. The emissions test part of the inspection procedure is identical to an initial inspection. If a vehicle passes an after repairs inspection, the operator must enter information about the vehicle's repairs. This occurs after the emissions test and before entering the sticker number. The procedure below provides details.

1. The inspector enters their access codes to initiate an inspection.
   — Indicate the test type on the screen that displays.
2. Enter vehicle data as detailed in the previous section.
3. Perform the emissions tests as detailed in *Fuel Cap Test, page 2-12* and *OBD Test, page 2-16*.
4. After the emissions test is complete the following question displays:

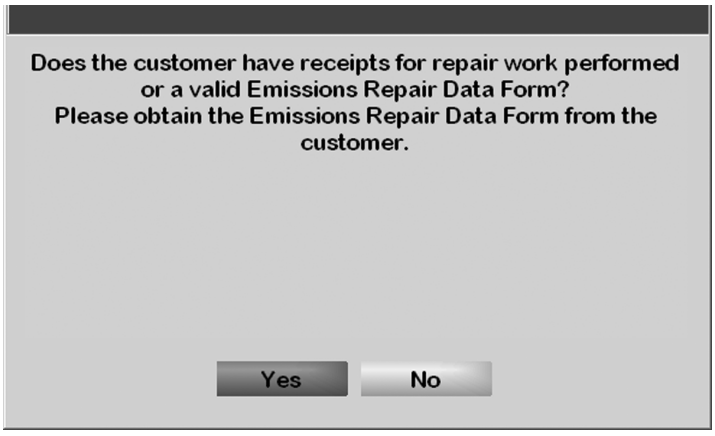


Figure 2-39: Receipts or Emissions Repair Data Form

DOES CUSTOMER HAVE AN EMISSIONS REPAIR DATA FORM FORM A CERTIFIED EMISSIONS REPAIR FACILITY (CERF)?

— Obtain a CERF form from the customer and select YES to continue.

5. Next, you are asked if repairs were made at this station. Select Yes (Y) or No (N).
   — Obtain and use the receipts from the customer to enter the date the repair work was performed on the vehicle.
6. If not repaired at this station you are asked if customer repaired the vehicle.

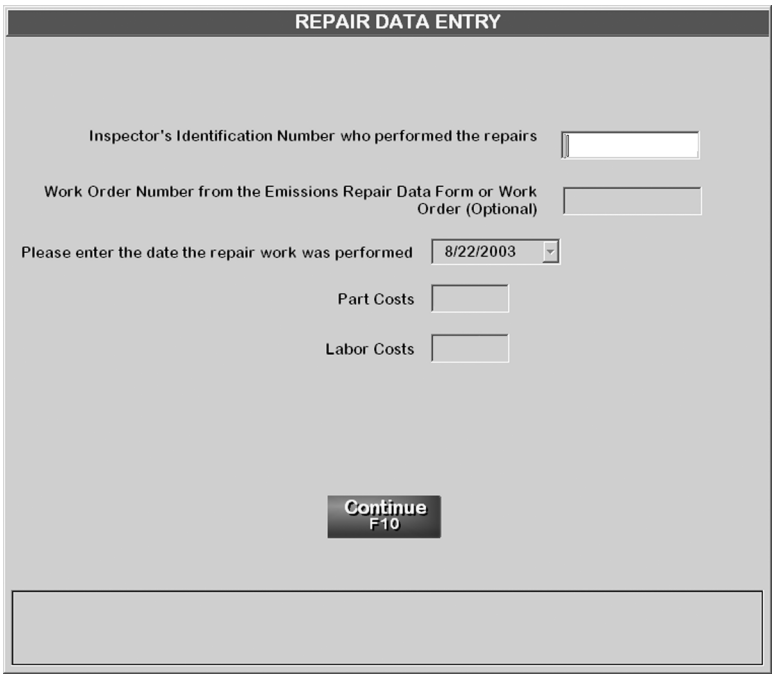


Figure 2-40: Repair Data Entry

7. Use the customer provided information to enter the following data when requested:
   — Repair facility number
   — Inspector number
   — Work order number
   — Repair date
   — Parts cost
   — Labor cost

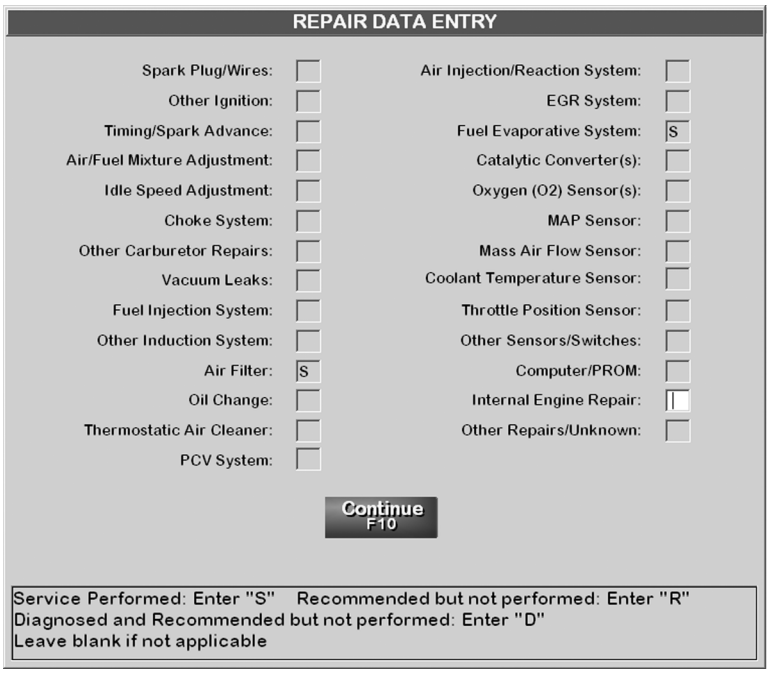


Figure 2-41: Repair Data Entry Categories

8. Select from the repair categories provided in the vehicle repair categories list.
   - — Press enter to select a category. Select "S" if the vehicle was serviced for this repair;
   - — Select "R" if the technician only recommended the repair.
   - — Select END to exit the vehicle repair categories list.
9. The following question displays:

DOES CUSTOMER HAVE ADDITIONAL REPAIR DATA FORMS?

✓ If the answer is Yes, repeat steps 5–8.



Figure 2-42: Test Fee Entry

10. Enter the amount charged for the inspection fee.
    - The analyzer contacts the VID and transmits test results to the host, **or**
    - You are prompted to enter a sticker/decal number for passing vehicles.

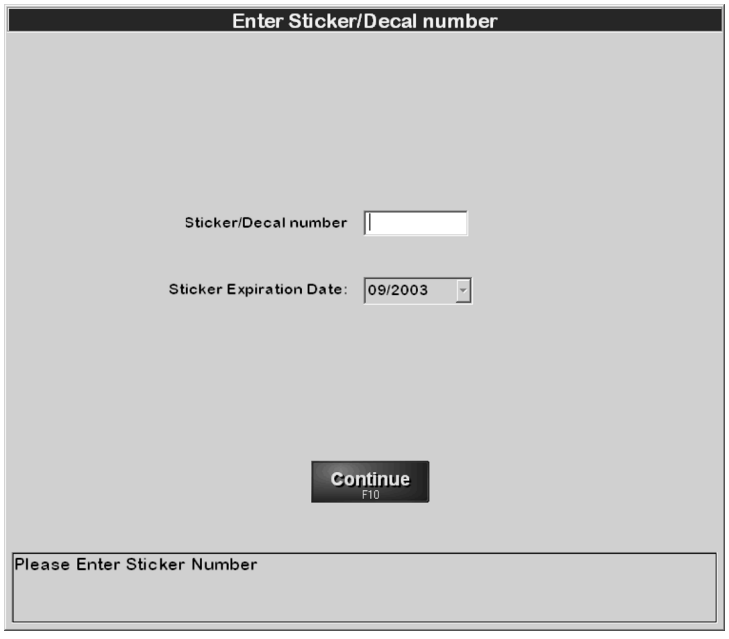


Figure 2-43: Sticker/Decal Number

11. If the vehicle passed the test, enter the next sticker number.
    - Enter the sticker number expiration date if different from the default date that displays.

3

Equipment Maintenance Menu

This chapter contains procedures for the Equipment Maintenance Menu including:

— *Status Screen, page 3-2*
— *Fuel Cap Pressure Test Calibration, page 3-3*



Figure 3-1: Equipment Maintenance Menu

1. Select Equipment Maintenance from the Vehicle Emissions Inspection Menu.

Status Screen

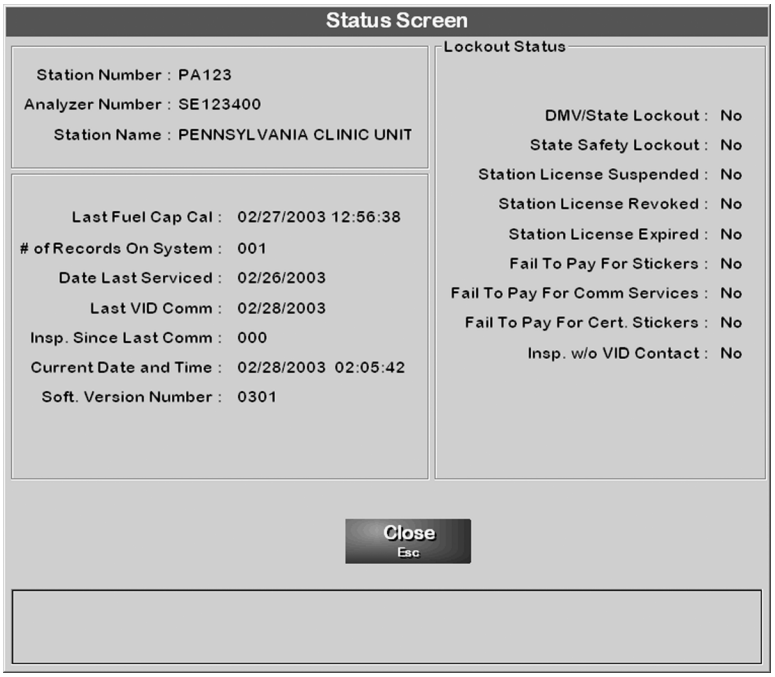


Figure 3-2: Status Screen

The Status Screen provides general analyzer system information including:

- Station Information
- Testing Activity Information
- Lockout Status

✓ To perform emissions testing, all status readings must be clear.

To access the Status Screen:

1. Select Vehicle Emissions Inspection Menu, Equipment Maintenance Menu, Status Screen.
   — Select Close (Esc) to return to the Equipment Maintenance Menu.

Fuel Cap Pressure Test Calibration

✓ A Fuel Cap Pressure Test Calibration must be performed within 72 hours of Vehicle Emissions Inspection testing.

1. Select Fuel Cap Pressure Test Calibration from the Equipment Maintenance Menu. See *Figure 3-1*. The Fuel Cap Pressure Test calibration procedure begins.
2. Enter your inspector ID prior to starting the calibration procedure.

✓ This is the same information required to perform an inspection.

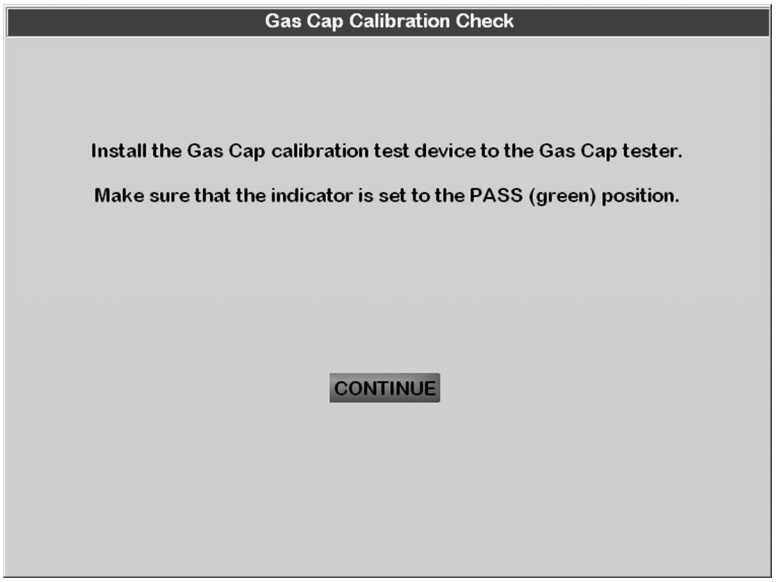


Figure 3-3: Gas Cap Calibration Check, PASS

3. Using the calibrator connected to the gas cap tester, place the valve on top to point to the green cap and select Continue.

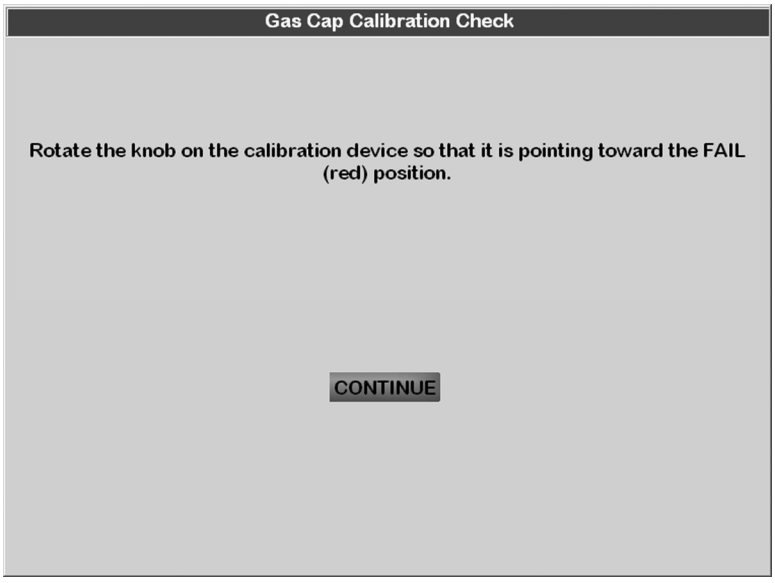


Figure 3-4: Gas Cap Calibration Check, FAIL

4. Using the calibrator connected to the gas cap tester, place the valve on top to point to the red cap and select Continue.

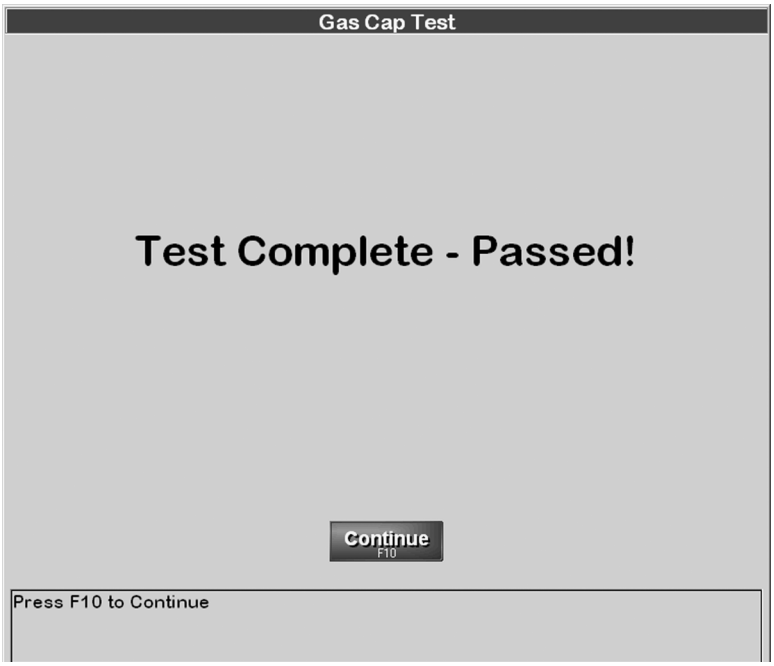


Figure 3-5:

5. A Passed or Failed screen displays at the end of the procedure.

✓ If the gas cap fails, repeat the procedure again paying close attention to the instructions.

✓ The gas cap calibration must PASS to perform inspections.

4

Sticker Maintenance

This chapter contains procedures for Sticker Maintenance including:

- *Issue Waiver Sticker, page 4-2*
- *This Year's Mileage Less Than 5000, page 4-6*
- *New Vehicle Exemption, page 4-8*
- *Sticker Replacement, page 4-8*
- *Voided or Damaged Sticker, page 4-8*
- *Missing or Stolen Sticker, page 4-8*
- *Issue Diagnostic Exemption, page 4-9*

Use Sticker Maintenance to replace lost stickers and issue stickers under special circumstances.

✓ Procedures are specified by the State. Review State regulations for eligibility requirements or contact the State.



Figure 4-1: Sticker Maintenance Menu

1. To access, select Main Menu > Emissions Inspection > Sticker Maintenance Menu.
2. Enter license number and access code.
   — A license number and access code must be entered for each item on this menu.
3. For waivers, minimum mileage, new exemption, and sticker replacement, provide the following data.
   — VIN (twice)
   — Vehicle license plate number (twice)
   — Title number

   This data entry procedure is identical to the data entry for an emissions test.

Issue Waiver Sticker

1. Select Issue Waiver Sticker from the Sticker Maintenance Menu. See *Figure 4-1*.

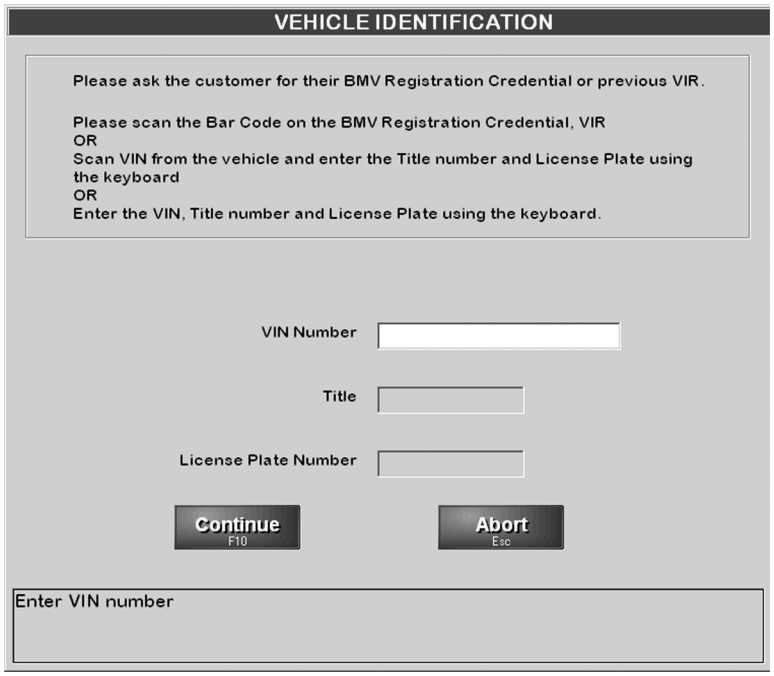


Figure 4-2: Vehicle Identification

2. Perform one of the following:
   — Scan the barcode on the BMV Registration Credential or VIR,
   — Enter the VIN, Title Number and License Plate using the keyboard.
3. Confirm that entries are correct or edit.

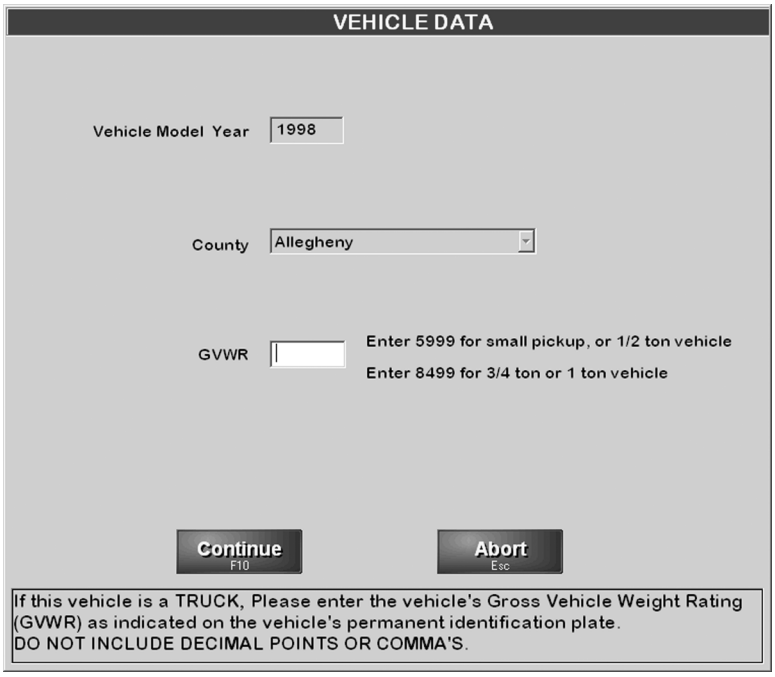


Figure 4-3: Vehicle Data

4. Enter the Vehicle Model Year, County and GVWR.

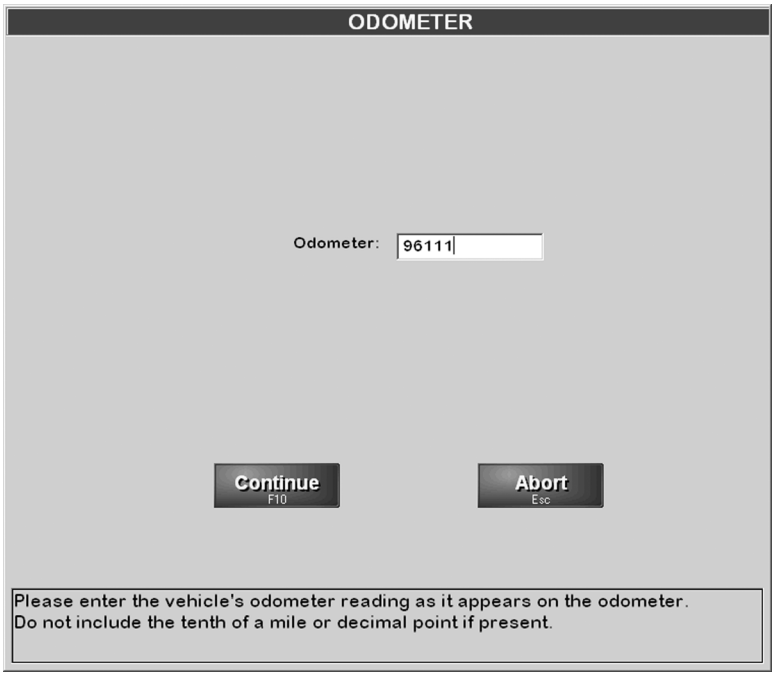


Figure 4-4: Odometer Reading

5. Enter the number of miles on the odometer.
   — Do not enter fractions or tenths of a mile.

✓ Waivers are issued only by State regulation and may be denied. Contact the State for help.

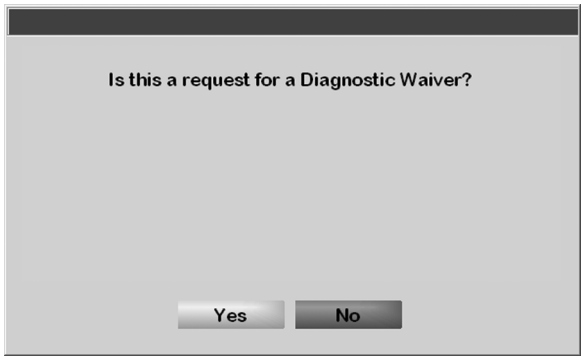


Figure 4-5: Request for Diagnostic Waiver

— If the Waiver Request is valid, the question shown in *Figure 4-5* displays.



Figure 4-6: Repairs Performed?

6. Answer the question regarding repairs.
   — If Yes is entered, information regarding the repair is requested as in a reinspection procedure.



Figure 4-7: Contacting the VID

7. The analyzer contacts the VID to verify a previous reinspection was done.

✓ The VID determines if a waiver is issued.

8. If a waiver is approved, the analyzer prompts you for the sticker number.
   — Enter the sticker number, which the analyzer stores for transmission to the host computer.

This Year's Mileage Less Than 5000

1. Select This Year's Mileage Less Than 5000 from the Sticker Maintenance Menu. See *Figure 4-1*.

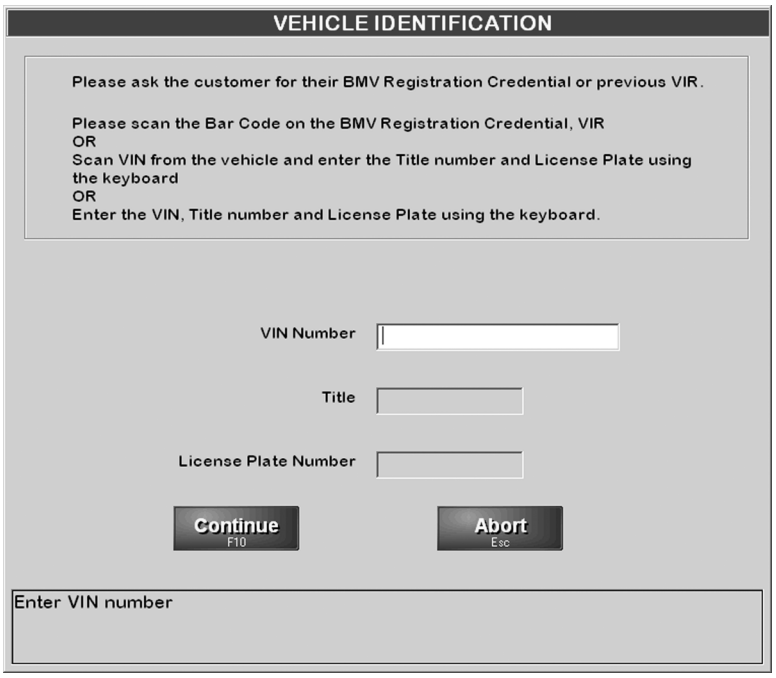


Figure 4-8: Vehicle Identification

2. Perform one of the following:
   — Scan the barcode on the BMV Registration Credential or VIR,
   — Enter the VIN, Title Number and License Plate using the keyboard.

3. Confirm that entries are correct or edit.

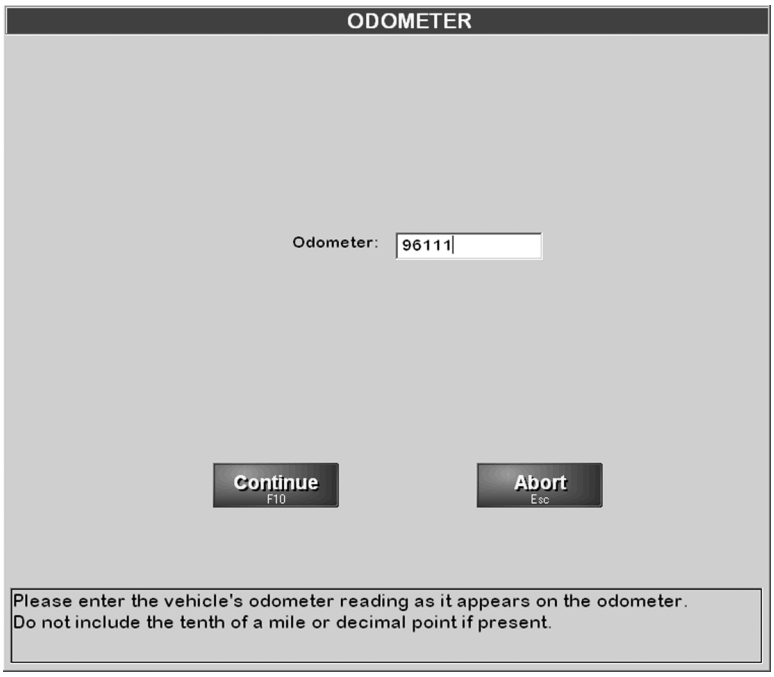


Figure 4-9: Odometer Reading

4. Enter the number of miles on the odometer.

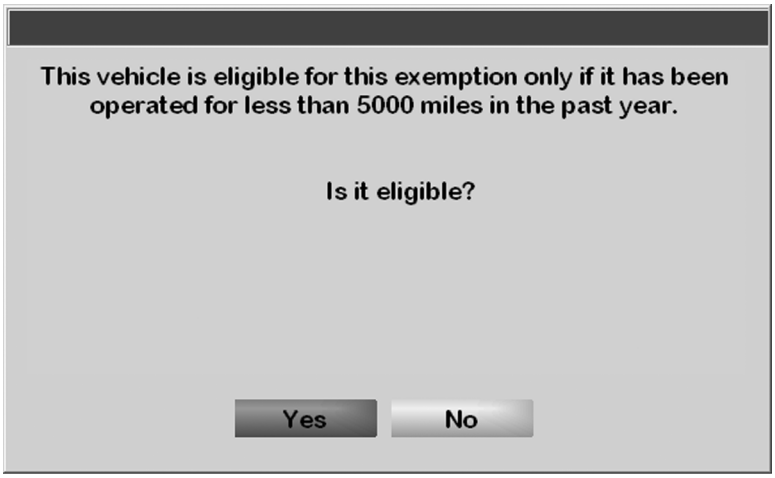


Figure 4-10: Vehicle Eligible?

5. Analyzer asks if vehicle is eligible for an exemption. Select:
   — YES if the odometer reads less than 5000 miles.
   — NO if the odometer reads more than 5000 miles.

6. If Yes is selected, enter sticker number and expiration date.

7. The data is saved to the analyzer record and a report is printed.

New Vehicle Exemption

✓ Use the same general procedure as previously described for the following two items.

1. Select New Vehicle Exemption from the Sticker Maintenance Menu.

2. Analyzer asks if vehicle is eligible for an exemption. Select:
   — Yes, if the vehicle has never been registered in Pennsylvania and the odometer reads less than 5000 miles.
   — Otherwise, select NO.

3. If approved, enter sticker number and expiration date.

4. The data is saved to the analyzer record and a report is printed.

Sticker Replacement

1. Select Sticker Replacement from the Sticker Maintenance Menu.
2. Select Yes to verify that the sticker is present for replacement.
   — Select NO if the sticker is not present for replacement.
3. If approved, enter sticker number and expiration date.
4. The data is saved to the analyzer record and a report is printed.

Voided or Damaged Sticker

✓ Vehicle information is not required for the following two items.

1. Select Record a Voided or Damaged Sticker from the Sticker Maintenance Menu.
2. Enter the number of the sticker in question.

Missing or Stolen Sticker

1. Select Record a Missing or Stolen Sticker from the Sticker Maintenance Menu.
2. Enter the number of the sticker in question.

Issue Diagnostic Exemption

1. Select Issue Diagnostic Exemption.
2. Enter the VIN, Title Number and License Plate using the keyboard.

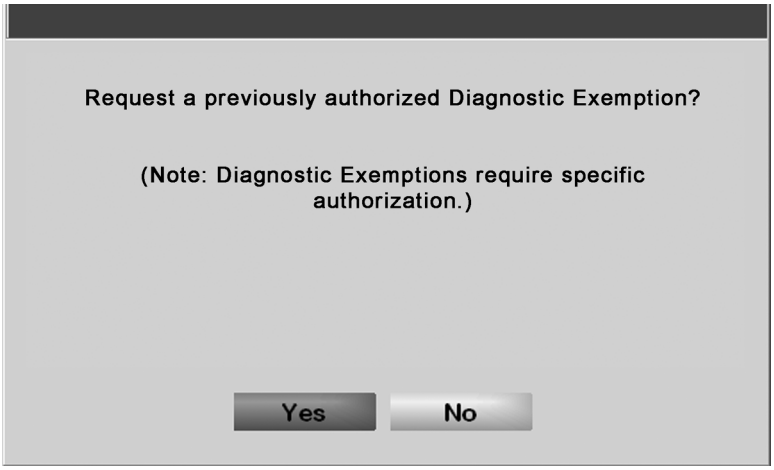


Figure 4-11: Diagnostic Exemption

3. Select Yes and the analyzer contacts the VID to verify that the exemption is allowed. See *Figure 4-11*.
4. If the data entered cannot be found on the VID you can try again or contact the state.

5 Diagnostic Functions

Use the Diagnostic Functions Menu to perform vehicle diagnostic tests and gather information about system testing devices. Options include:

- *Snap-Link, page 5-1*
- *OBDII Test, page 5-2*
- *Barcode Reader Test, page 5-4*
- *Gas Cap Integrity Test, page 5-5*

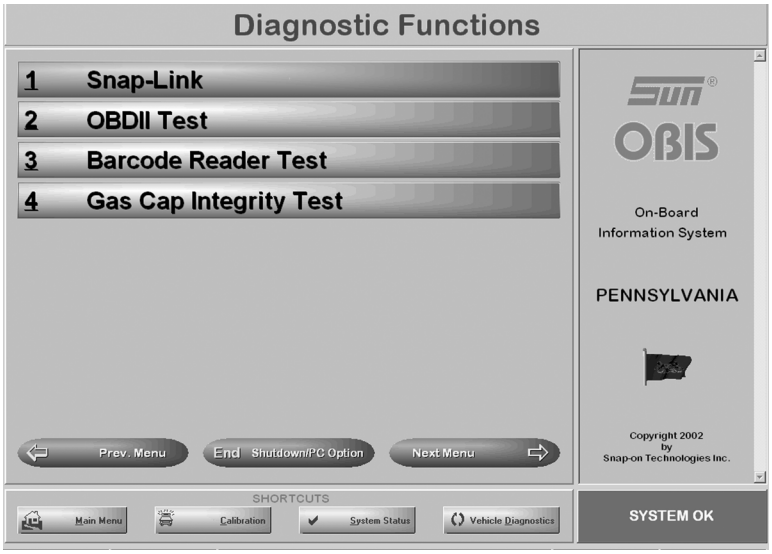


Figure 5-1: Diagnostic Functions

Snap-Link

Select ***Snap-Link*** from the Diagnostic Functions Menu for a screen that allows you to connect a ***Snap-on*** scanner to the PC and display, analyze and print live vehicle data.

✓ The scanner must be a ***Snap-on*** scanner.

✓ Follow the instructions in the ***Snap-Link*** manual for operation of the software.

OBDII Test

Use to perform of *OBD II* Tests and diagnose vehicle emissions problems. OBDII data gathered from the test includes:

- Module Information
- Monitor
- Key Information
- DTC Information

✓ This can be used to pre-test *OBD II* vehicles.

The *OBD II* Communications Test provides a fast and easy method to "pretest" OBD-equipped vehicles or as a quick diagnostic tool. ***Snap-Link*** and your ***Snap-on*** scanner can be used for in-depth diagnostics.

To perform the *OBD II* Test:

1. Select OBDII Test from the Diagnostics Function Menu.

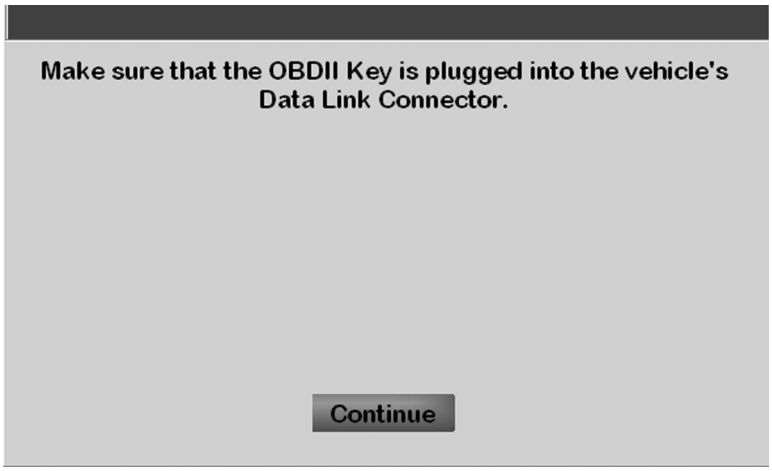


Figure 5-2: OBDII Key in DLC

2. Plug the OBDII key into the vehicle's DLC, start the engine and let it idle. Select Continue.

✓ You cannot escape until the OBD times out.

— If communication is successful, the following message displays with progressing status information:

INITIALIZING OBDII

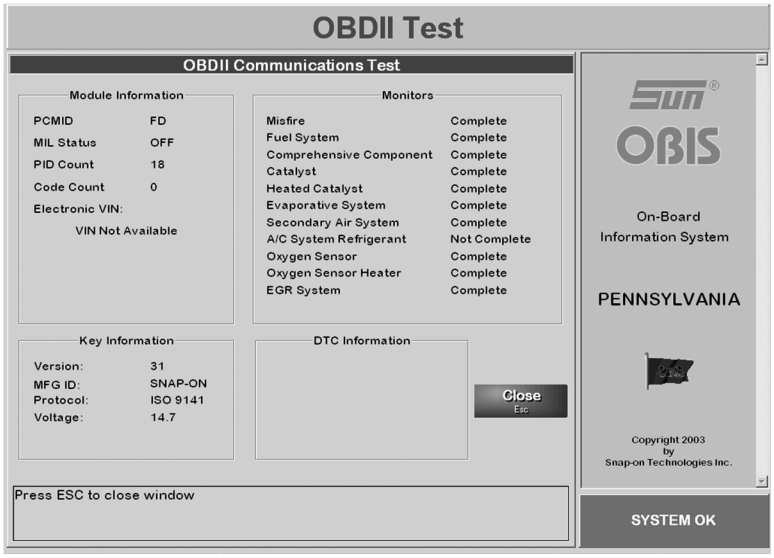


Figure 5-3: OBDII Test Screen

3. After communication is established, the OBDII Test Screen displays with the data collected.
   — Select Close or press Esc to return to the Diagnostic Functions Menu.

Barcode Reader Test

Use this feature to verify that the barcode reader is functioning properly.

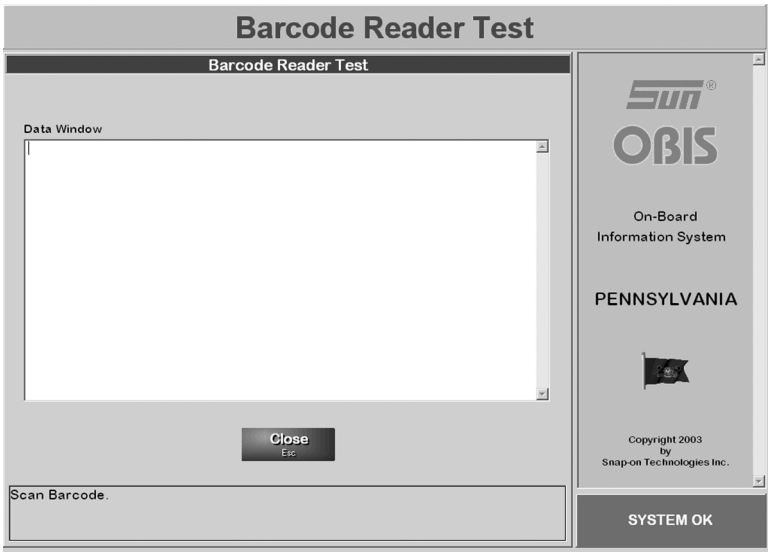


Figure 5-4: Barcode Reader Test

1. Select Barcode Reader Test from the Diagnostics Function Menu.
   — The Barcode Reader Test screen displays.
2. Scan a barcode. See *Using the Bar Code Scanner, page 1-16*.
   — If successful, the barcode value displays in the Data Window verifying that the barcode reader is functioning properly.
   — Select Close or press Esc to return to the Diagnostic Functions Menu.

Gas Cap Integrity Test

Use this feature to determine if a gas cap is functioning properly.

✓ Place cap being tested on correct adapter before selecting the Gas Cap Integrity Test.

1. Select Gas Cap Integrity Test from the Diagnostics Function Menu.

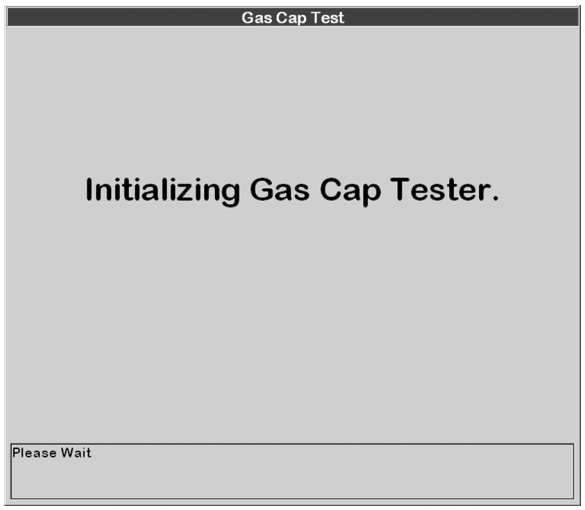


Figure 5-5: Initializing Gas Cap Tester

— The Initializing Gas Cap Tester screen displays.

2. The test is performed and results provided.

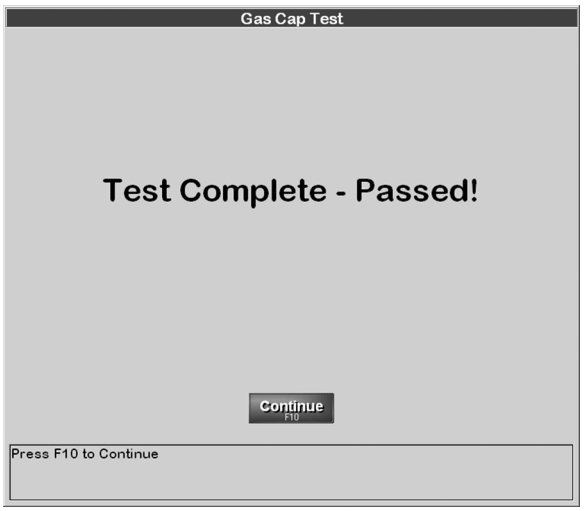


Figure 5-6: Test Complete

3. The Gas Cap Test Complete Screen displays with the Passed or Failed results of the test.
   — Select Continue (F10) to return to the Diagnostic Functions Menu.

Station Menu

The Station Menu allows the station owner to perform a number of special actions. Each menu item is described in this section.

To access the Station Menu, select Station Menu from the Main Menu.



Figure 6-1: Station Menu

✓ Access to the Station Menu is protected by a unique password. The default password for a new analyzer is “Station.”



Figure 6-2: Manager Logon

IMPORTANT

If you change the password and forget the new code, it cannot be reset. A paid service call to reload the code is required.

Print Sticker Used Report

Use Print Sticker Used Report to print a report of all stickers issued at the station for the past 31 days or less.

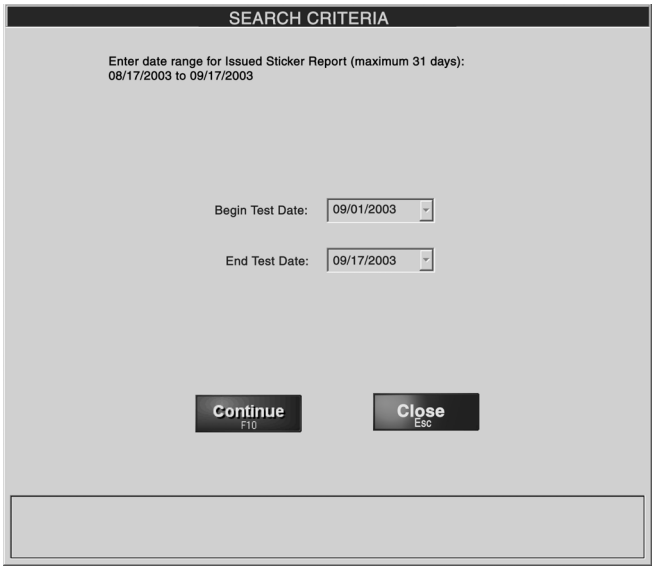


Figure 6-3: Sticker Used Report Search Criteria

1. Select Print Sticker Used Report from the Station Menu.

2. Select dates in the Begin Test Date and the End Test Date fields and select Continue (F10).

✓ Use the calendar provided on the dropdown or enter the month and/or day using the up and down arrow keys. The dates selected must be with 31 days of the current date.

3. Select Yes to verify the report request and is report prints.

Network Communications Diagnostics

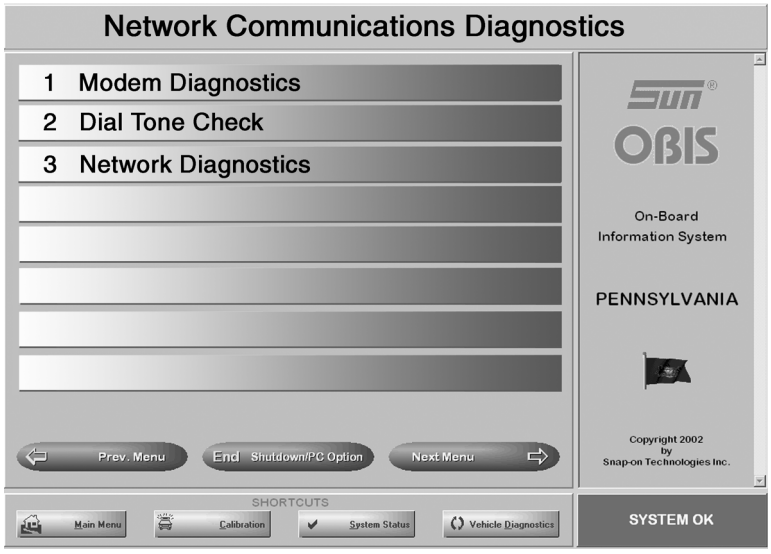


Figure 6-4: Network Communications Diagnostics

Use the Network Communications Diagnostics to diagnose communication problems with the host computer. See *Figure 6-4*.

✓ The analyzer can pass all of the Network Diagnostics tests and still not be able to communicate with the host computer for actual emission testing.

Modem Diagnostics

Use the Modem Diagnostics feature to test the analyzer modem.

✓ The modem is a device that allows data to be sent back and forth between the analyzer and the host computer using telephone lines.

— The Dialtone Test verifies the phone connection between the analyzer and the telephone wall jack.

1. From the Station Menu > Network Communications Diagnostics, select Modem Diagnostics.
   — The modem is OK if the following message displays:

   MODEM DIAGNOSTICS PASSED

   — Call Service to repair the analyzer if the following message displays:

MODEM DIAGNOSTICS FAILED. CALL SERVICE.

Dial Tone Check

The Dial Tone Check verifies that there is a phone connection between the analyzer and the telephone wall jack.

1. From the Station Menu > Network Communications Diagnostics, select Dial Tone Check.
   — The analyzer attempts to detect a dial tone.
2. Dial tone detected:

   DIAL TONE DETECTED - PASSED

   Dial tone NOT detected:

NO DIAL TONE DETECTED - FAILED. CHECK TO SEE THAT PHONE CORD IS CONNECTED. POSSIBLE FAULTS CAN BE CHECKED USING A STANDARD PHONE AT BOTH THE EQUIPMENT END OF PHONE CABLE OR AT THE WALL PLUG FOR PHONE. IF NO DIAL TONE ON PHONE CABLE - CONTACT PHONE COMPANY. IF DIAL TONE DETECTED USING PHONE THE FAULT IS IN EQUIPMENT - CALL SERVICE.

Plug a standard telephone into the wall jack used by the analyzer and attempt to make a call. If you can call out successfully using the telephone, call ***EquiServ*** to repair the analyzer.

✓ Do not contact the telephone company; the telephone line is fine.

If you cannot place a call, contact the phone company, as the analyzer is fine.

Network Diagnostics

1. From the Station Menu > Network Communications Diagnostics, select Network Diagnostics.
   — The analyzer attempts to contact the host computer.
2. Review the status message.
   — If data on the analyzer and the host match, the following message displays:

   NETWORK COMMUNICATIONS PASSED

   — If data on the analyzer and the host do not match, the following message displays:

   NETWORK COMMUNICATIONS FAILED

   — If the analyzer and the host cannot communicate the following message displays:

   CANNOT ACCESS NETWORK. CALL TECHNICAL SUPPORT

✓ For additional information refer to *Troubleshooting Communication Problems, page 6-6*.

Troubleshooting Communication Problems

If you experience communication problems, perform the following diagnostics using the “Network Diagnostics” function. This is the most comprehensive test and provides the most information rapidly. Following is a list of error messages that may occur and possible corrective actions.

FAILED AUTOMATIC NUMBER IDENTIFICATION (ANI) CHECK

Call ***MCI*** help desk and verify the analyzer phone number is correct.

GENERAL EXCEPTION

Call ***MCI*** help desk.

INVALID SERVER RESPONSE

Call ***MCI*** help desk.

INVALID STATION OR ANALYZER ID

Call ***MCI*** help desk and verify your Station Number or analyzer number are correct. The Station Number can be found on the Status page.

NO DIAL TONE

Check the phone line to the analyzer, using a telephone for testing. If OK, perform Modem Check.

LINE BUSY

Try again, then check phone number, or call ***MCI*** help desk.

NO ANSWER

Try again, then check phone number, or call ***MCI*** help desk.

TRY AGAIN or INVALID TOKEN

Call ***MCI*** help desk.

Data File Refresh



Figure 6-5: Data File Refresh

1. Select Main Menu > Station Menu > Data File Refresh to place a call to the host computer and update **all** data on the analyzer.
   — The Network Access screen displays when the call is placed. See *Figure 6-5*.

   The updating process works as follows:
   — A call is placed to the host computer.
   — Data is refreshed by the host.
   — Updated inspector and certificate information displays.

2. When the successful update is complete, the following message displays:

THE INSPECTOR LICENSE NUMBERS AND ACCESS CODES HAVE BEEN UPDATED BY THE VIID. IN CASE THERE ARE PROBLEMS CONTACT PENNDOT OR MCI.

   — If the analyzer does not communicate with the host, the following message displays:

CANNOT ACCESS NETWORK

3. The screen displays a list of current station and inspector information.
   — Press F3 to print this report for your file and Exit.

✓ To view data prior to printing and exiting the screen, follow the prompts on the bottom of the screen if more than one page is available.

✓ If the procedure fails, "wait" a few minutes and try again.

Previous Vehicle Inspection History

Use Previous Vehicle Inspection History to obtain a report listing previous emissions inspections, waivers, exemptions and emissions related repairs on the host for a vehicle.

✓ The station is charged for this report and you are asked to verfiy that you want to proceed.

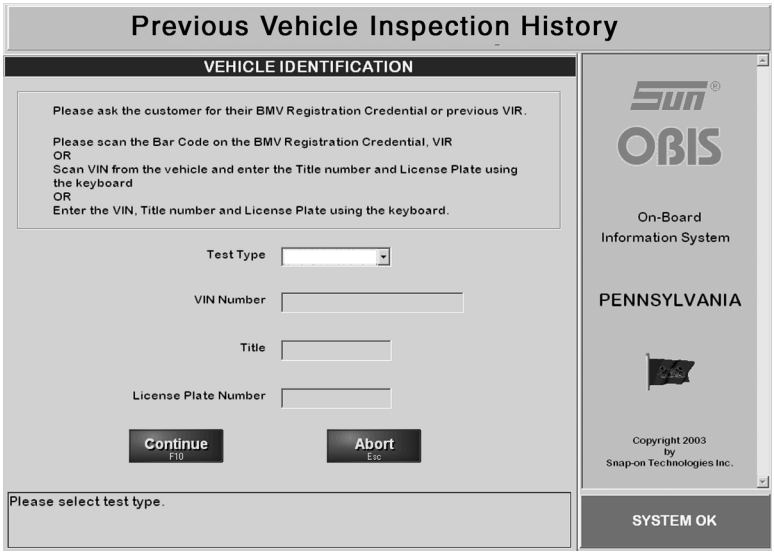


Figure 6-6: Network Communications Diagnostics

1. Select Main Menu > Station Menu > Previous Inspection History Report to place a call to the host and retrieve data for a specific vehicle.
   — When selected, the following displays:

A Previous Inspection History Report for a Vehicle Has Been Started.

This report will list previous emissions inspections, waivers, exemptions and emissions related repairs on file in the central host computer for this vehicle. There will be a charge to the station equivalent to an emissions inspection communications charge for this report. You may exit at any time prior to final placing of the call to the main host computer.

Do you wish to proceed? Yes or No

2. Select Yes or No.
3. Scan or manually enter the VIN from the BMV Registration Credential. All other information is optional.
   — Before sending the request to the host, the following message displays:
   Is this vehicle information correct?
   — If No is selected, correct the VIN number and proceed.
   — If Yes is selected, the analyzer contacts he VID.
4. Data, if available, displays on the screen and a report prints.
   — Press F3 for an additional copy of the report.
   — Press F10 to end.

Print Communication Log

Use the Print Communications Log feature to view an on-screen record of all communications between the analyzer and the host computer that occurred in the last 14 days. The analyzer offers the option to select a particular communications event for printing.

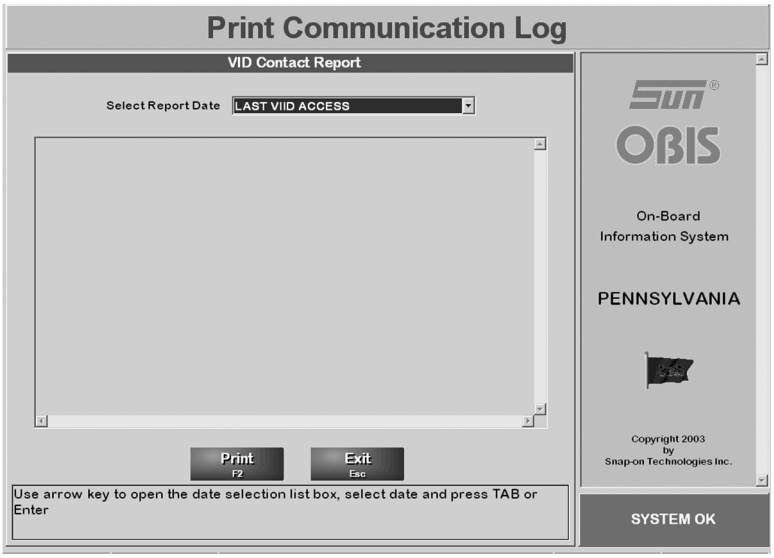


Figure 6-7: Print Communications Log

1. To access, select Main Menu > Station Menu > Print Communications Log.

✓ This report contains no information useful to the user.
— Select this function only when advised by the Communication Help Desk.

Test Record Search and Retrieval

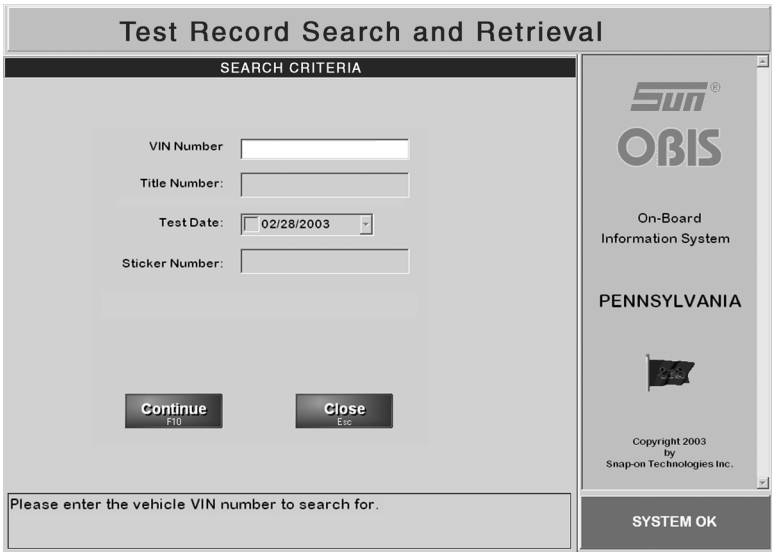


Figure 6-8: Test Record Search

Use Test Record Search and Retrieval to display a list of all inspections for a VIN performed at the station during the past 30 days.

1. To access, select Main Menu > Station Menu > Test Record Search and Retrieval.
   — The Search Criteria screen displays. See *Figure 6-8*.

2. Enter the VIN number and the Title Number, Test Date and/or Sticker Number.
   — A report displays on the screen or can be printed. Test record information includes date, begin time, VIN, vehicle license, year, make, model and Inspector ID.

✓ Press F10 to search for a specific record.

✓ Press F9 to see all stored reports.

✓ The more data entered, the faster the search.

3. Use the arrow keys to scroll the list and select a single vehicle inspection record for display.

4. Once a record is located, review the complete vehicle inspection record and print an individual record using the VIR printer.

✓ Both the on-screen and printed report are the same.

   — To print from the view screen press F3.
   — To close, press Esc until the Main Menu displays.

Request Lockout Status

Use the Request Lockout Status to clear lockouts set by the host computer once the cause of the lockout has been resolved. When this function is selected, the analyzer places a call to the host computer and the lockout status is updated.

✓ Remember that a lockout can be set or cleared by the host computer.

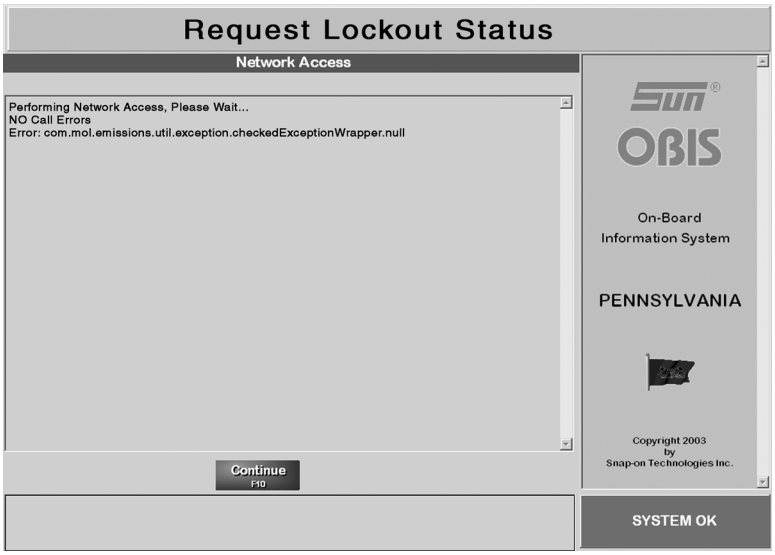


Figure 6-9: Request Lockout Status

1. To access, select Main Menu > Station Menu > Request Lockout Status.
   — If the host computer has a lockout set, only the host computer can clear it.
2. The analyzer communicates with the host and updates the lockout status.

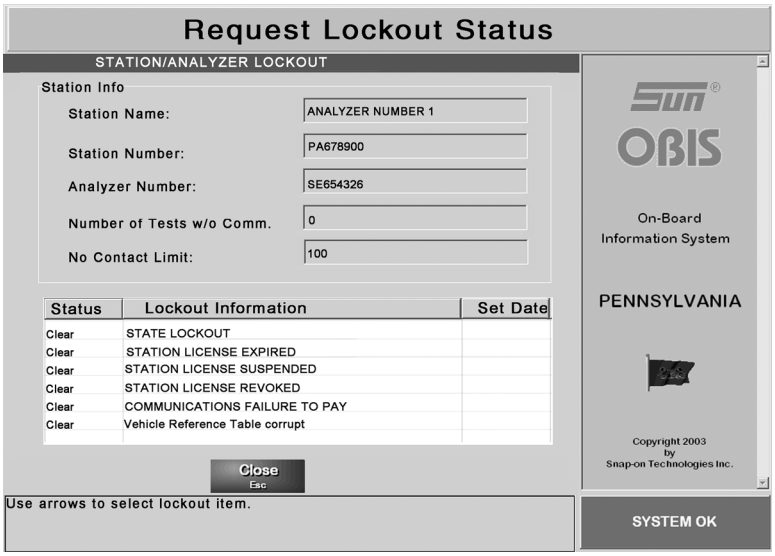


Figure 6-10: Request Lockout Status, Report

3. An on-screen report displays for review. See *Figure 6-10*.

✓ The report shows your allowed "No Contact Limit."

✓ The status must show "Clear" for all items to perform tests.

✓ If the analyzer is locked out, contact the ***MCI*** Help Desk to have the problem corrected or to discuss the problem.

4. Select Esc to Exit.

Emergency Software Update

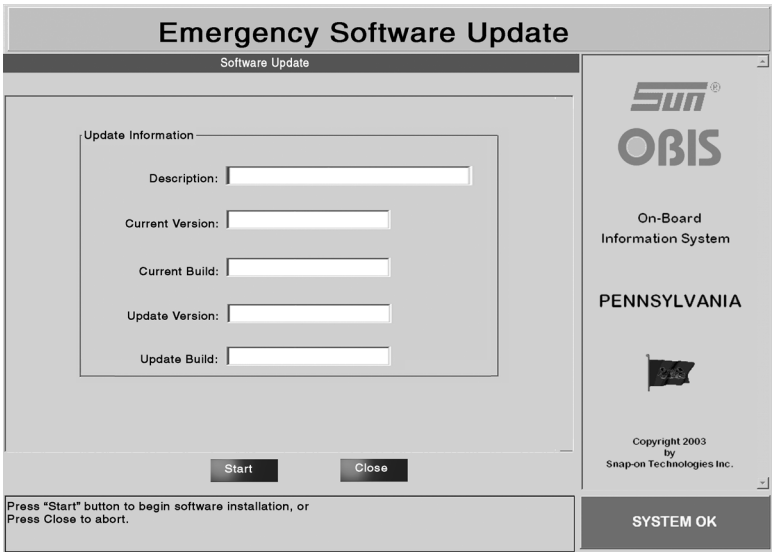


Figure 6-11: Emergency Software Update

Use the Emergency Software Update function, when required, to download changes and updates to analyzer software.

1. Insert the Update CD into the CD drive of the PC. See *Analyzer Front, page 1-4* for CD locations.

2. Select Software Update from the Station Menu. The screen in *Figure 6-11* displays. Follow the on-screen instructions until the update is complete.

3. Select F10 to update with a CD.

Remote Software Update

Remote Software Updates are available two ways:
- Manual (user invoked) and
- Automatic (analyzer invoked)

After a predetermined number of days, the analyzer checks the ***Snap-on*** host for software updates each time the analyzer is started. It is recommended that all available updates are performed.

✓ If a software update is available and not installed, you are offered the update each time the analyzer starts until installation is completed.

IMPORTANT **If mandatory State software updates are not performed, a State-mandated lockout may occur.**

Manual

1. Select Main Menu > Station Menu > Remote Software Update.
   — The analyzer communicates with the ***Snap-on*** host and checks for software updates.

2. If an update is available, select Yes to install.
   — The update is performed without user intervention and the analyzer restarts the ***OBIS*** program.

Automatic

If a software update is available, you have the option of installing the update.
- Select Yes to install.
  — The update is performed without user intervention and the analyzer restarts the ***OBIS*** program.
- Select No and the update is not installed.

  ✓ If a software update is available and not installed, you are offered the update each time the analyzer starts until installation is completed.

7

Other Functions

Topics in this section include:

- *VIR Reprint / Record Search - Retrieval, page 7-1*
- *Training Mode, page 7-3*
- *Print Rejection From Testing Forms, page 7-4*

VIR Reprint / Record Search - Retrieval

✓ A replacement VIR can be printed from the selected test record.

✓ A replacement VIR is labeled "DUPLICATE"
If no data is available to print on the VIR, "Data not available" displays in the missing data field.

✓ When the VIR is reprinted, the Vehicle Emissions Inspection Menu displays.

Use VIR Reprint / Record Search - Retrieval, allows to search for and reprint a Vehicle Inspection Report. No test is performed—the analyzer simply prints another copy of the results of the vehicle's last inspection test.

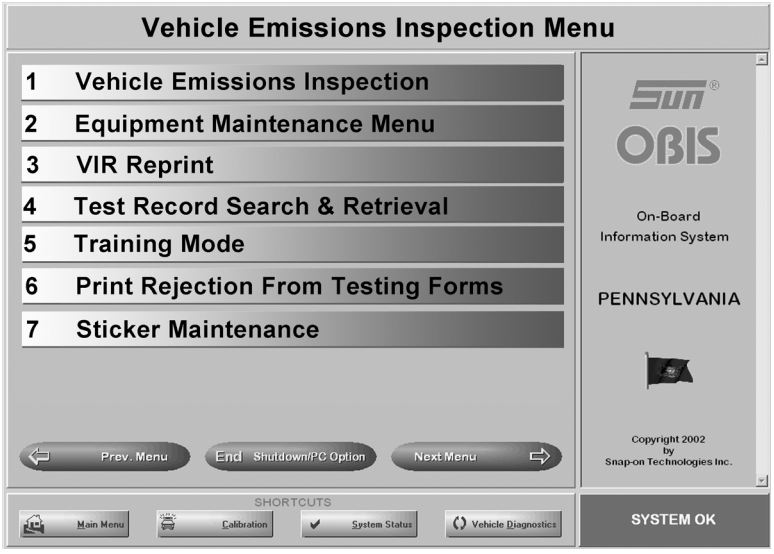


Figure 7-1: Vehicle Emissions Inspection Menu

1. Select Test Record Search & Retrieval from the Vehicle Emissions Inspection Menu.

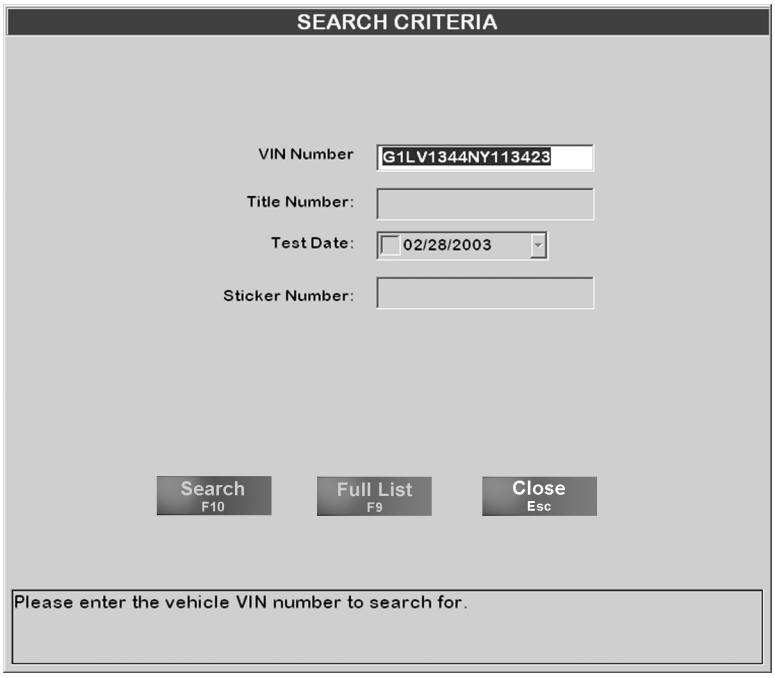


Figure 7-2: VIR Reprint Search Criteria

2. Enter the required vehicle data in the Search Criteria Screen that displays and select Search (F10).
   — Press F9 to view all tests stored.

✓ Entry in all fields is not required but, the more information provides a faster the search.

✓ All test records stored on the analyzer are searched.

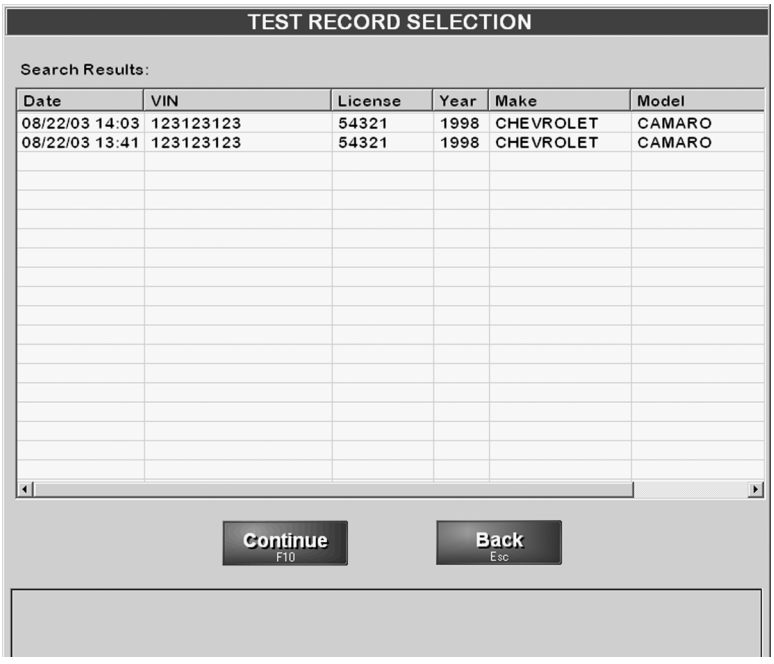


Figure 7-3: Test Record Selection

3. Use the arrow key to select a record from the Test Record Selection screen that displays. Select:
   — Continue (F10) to review and print the record,
   — Back (Esc) twice to exit, once to return to Search.

Training Mode

Use the Technician Training function to simulate actual inspections. The major difference between training and inspection modes is that in training mode, no certificate is issued, no calls are made to the host computer, and lockouts do not apply.

The training test sequence matches an actual inspection or reinspection with the following exceptions:

- No access code is required,
- No certificate is issued.

✓ The analyzer must be completely functional to perform a Training Test.

1. Select Training Mode from the Vehicle Emissions Inspection Menu.

✓ If faults exist in the analyzer, system faults or warnings currently present when appear in the lower right of the screen.

— In some cases, a training test cannot be performed if certain information (such as Station Information) is missing.

2. The test procedure is identical to an actual vehicle emissions inspection. See detailed procedures:
   — *Vehicle Data Entry, page 2-2*
   — *Fuel Cap Test, page 2-12*
   — *OBD Test, page 2-16*
   — *After Repairs Tests, page 2-23*
   — *Visual Inspection*
3. When the Training Mode inspection is complete, the analyzer prints a training VIR and returns to the Vehicle Emissions Inspection Menu.

Print Rejection From Testing Forms

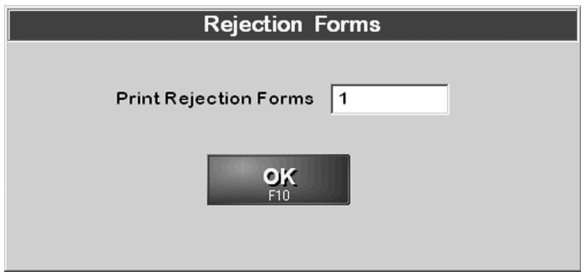


Figure 7-4: VIR Reprint Preview

1. Select Print Rejection From Testing Forms from the Vehicle Emissions Inspection Menu.

2. Enter the required number of forms to print and select OK (F10).

✓ This form is completed by hand.

8 General Maintenance

This chapter contains maintenance-related subjects, including:

- *General Routine Maintenance, page 8-1*,
- *Printer Operation and Maintenance, page 8-1*,
- *Maintaining the Bar Code Scanner, page 8-2*,
- *Connection Panels, page 8-3*, and
- *Accessories and Options, page 8-5*.

An operator should perform the analyzer maintenance and service procedures in this section on a regular or as-needed basis. All other service must be performed by an authorized service representative.

General Routine Maintenance

Weekly

Clean the monitor screen with glass cleaner, inspect all cables and replace if damaged.

Every 60 to 90 Days

Lubricate the cabinet casters with a light viscosity machine oil every 60 to 90 days.

Periodically

- Clean the test leads and power cord periodically with waterless hand cleaner and wipe dry.
- The analyzer has a painted stain-resistant finish. Clean the painted and plated surfaces with spray cleaner. Wipe down the cabinet periodically with a damp cloth.

Printer Operation and Maintenance

For information regarding printer operation and maintenance, refer to the user manual provided with the printer.

IMPORTANT **Do not change any of the default printer settings. Doing so may result in improperly printed inspection reports.**

Maintaining the Bar Code Scanner

The bar code scanner requires minimum care. Although specific maintenance is not required, the following periodic checks help to keep the scanner in optimum condition.

Cleaning the Scanning Window

Why

The bar code scanner uses an optical system protected by a window at the scanning end. It is important to keep this window clean, because if it becomes dirty, scratched, or smudged, the optics behind the window do not work properly.

When

The scanning window must be kept clean to assure that the unit scans successfully on the first attempt. The scanning window should be cleaned anytime scanning performance begins to degrade or when the window is visibly dirty.

How

If the scanning window becomes dirty, clean it by wiping a soft cloth or facial tissue dampened with water or a mild detergent and water solution.

If you use a detergent solution for cleaning, follow with a rinse step so no residues are left on the window.

- ✓ Use the same method to clean the scanner body.
- ✓ Do not submerge the scanner in water, as it is not water-tight. Do not use abrasive wipes or materials to clean the scanning window. Never use solvents such as alcohol or acetone on the scanning window, as they can damage the window finish.

Checking the Scanner Case

Check the scanner case periodically for signs of damage. A damaged case can lead to movement of the internal components, which can cause malfunctions.

Connection Panels
Analyzer Back Panel

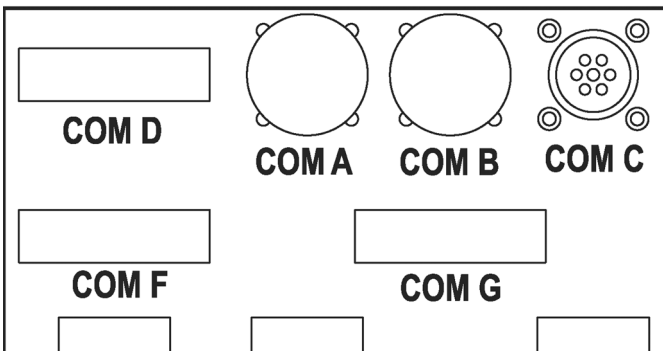


Figure 8-1: Connection Panel, Back of Analyzer

✓ Ports used depend on state requirements and optional equipment added to the analyzer. Some options may not be available for specific analyzer systems.

Ports and Connections

COM A	Not used
COM B	Not used
COM C (CPC Connector)	Gas cap tester
COM D	Not used
COM E (DB-25 Connector)	Snap-Link Cable
COM F	Not used
COM G	Not used
COM H (DB-25 Connector)	Bar code scanner
COM I (DB-9 Connector)	Spare, Comm One Serial
COM J	Not used
COM K	Not used
COM L (DB-9 Connector)	*OBD II* cable

Interface Box

The interface box is located behind the left front door of the analyzer.

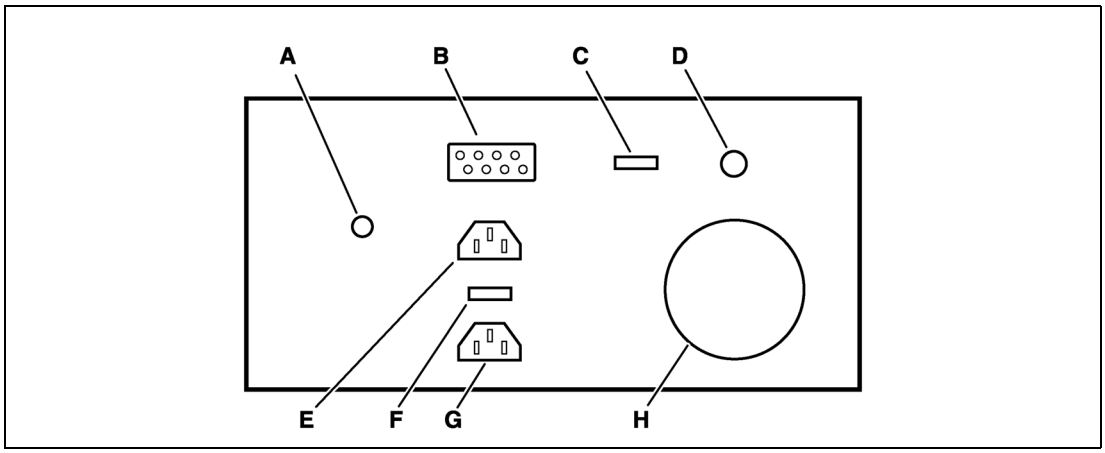


Figure 8-2: Connection Panel (Back of Analyzer)

Buttons, Connectors and Components

A– Power Button	Always on, powers interface box only — Do not turn off.
B– Security Switch Connector	Not used, allows security switches to be added, if necessary
C– USB to Computer Connector	Connects interface box to PC. – Never unplug while PC is on.
D– Remote Control Sensor Connector	The remote control sensor, located in the keyboard drawer, is connected to the interface box with this connector.
E– Power Cord Connector	115V power into interface box.
F– Voltage Selection Switch	Preset to 115V.
G– Spare 115V Outlet	115V power outlet, not used — Do not plug any device into this outlet
H– Cooling Fan	Interface box power supply cooling fan. — Do not block this fan.

Accessories and Options

Standard Accessories

Item	Part Number
Remote control	7009E9321-30
OBDII adapator	EAE0032L51A
OBDII interface cable	6-04122A 6-04222A
Barcode scanner	EEEH102A
Snap-Link package	EESP304A
Waekon gas cap tester	EAA0145C20A
Gas cap tester communication cable	EAW0166L03A
Operator's manual	ZEEEA136A

Options

Contact your ***Snap-on*** Sales Representative for complete details and information

Appendix A: OBD II Connections

A

To meet *OBD II* requirements, most 1996 and newer vehicles are equipped with two testing modes:

- Generic *OBD II*, and
- Enhanced *OBD II*.

This manual provides information on the Generic *OBD II* mode only.

Key Terms

Refer to the following list of terms and descriptions when using the *OBD II* information in this manual.

Baud Rate

The speed a controller transfers and receives data, measured in bits per second (bps).

Closed Loop

A state in which the engine controller controls and adjusts the air/fuel mixture based on input from the upstream oxygen sensor. The oxygen sensor must reach approximately 600° F before the engine runs in closed loop.

Comprehensive Components

Any component, other than a major monitor (i.e. fuel trim, catalyst, evaporative system, exhaust gas re-circulation (EGR), secondary air (AIR), oxygen sensor(s) (O_2S), oxygen sensor heater (HO_2S), misfire, that has any effect on vehicle emissions.

Conflict (or Disablement)

Condition that interferes with proper execution of a specific monitor.

Diagnostic Executive or Management System

Powertrain control module (PCM) software responsible for performing testing of powertrain components and systems, recording testing results, and controlling the illumination of the lamps.

Diagnostic Link Connector or Data Link Connector (DLC)

Connector where diagnostic scan tools interface with the vehicle's onboard computer. Under On-Board Diagnostics, second generation (*OBD II*), the DLC is a standardized 16-cavity connector and has a standardized location.

Diagnostic Trouble Codes (DTC)

Codes associated with engine controller fault messages identifying emission control components that are malfunctioning and that can be retrieved using a diagnostic scan tool.

Drive Cycle

Series of operating conditions that can operate all of the *OBD* monitors during a single driving event.

Enabling Conditions or Criteria

Exact engine operating conditions required for a diagnostic test to run.

Federal Test Procedure (FTP)

A transient-speed mass emissions test conducted on a loaded dynamometer. This is the test which, by law, car manufacturers use to certify that new vehicles are in compliance for hydrocarbon, carbon monoxide, and oxides of nitrogen emissions and must be passed before that model may be sold in the United States.

Fuel trim or metering

An engine control module (ECM) function that controls and adjusts the fuel delivery during closed-loop operation to bring the air/fuel mix to as close to the optimum ratio or (stoichiometry) as possible.

Functionality

Associated with comprehensive component testing in which outputs from the engine controller are verified by monitoring specific input signals from other components for expected change.

Good Trip

Trip counters in which various monitors pass testing under predetermined conditions. The fulfillment of specific test parameters during a drive cycle. Good trips are counted for MIL extinguishing and DTC erasure.

Heated Oxygen Sensor (HO2S)

Oxygen sensor that is heated electrically as well as by engine exhaust so that it warms to normal operating temperature more quickly.

*International Organization for Standardization (**ISO**)*

Worldwide federation of national standards bodies from some 130 countries, one from each country. ***ISO***'s work results in international agreements that are published as international standards.

ISO 9141

ISO recommended data communication network protocol or standard.

In Use Deterioration (IUD)

IUD is the effect of time and use on vehicle performance and emission systems.

Malfunction

Inability of an emissions-related component or system to remain within design specifications. Malfunction also refers to the deterioration of any of the components or systems to a degree that would likely cause the emissions of an average vehicle to exceed the emissions standards by 1.5% times.

Maturing Code (or Pending Code)

With certain DTC the PCM sets a temporary code that indicates a monitor has failed at least one time. The MIL remains off unless the problem occurs a specific number of times. Then the temporary code matured into a hard code and the PCM turned on the MIL.

Open Loop

State in which the air/fuel mixture is being controlled by the engine computer according to a standard program and essentially ignores the oxygen sensor signal. Normally encountered during the first few minutes of operation after a cold start.

Powertrain Control Module

Onboard control module that monitors engine functions or both engine and transmission/transaxle functions.

PCM Power Down

PCM power down is done by removing ignition voltage from the PCM for at least 10 seconds, typically by turning the ignition switch to the LOCK position. On some newer vehicles with electronic transmission gear selector indicators, the PCM stays powered up in the ignition key off position. A power down event allows the PCM to update certain memories and to complete DTC trips.

Pending Conditions

The PCM may delay running a monitor if an unresolved malfunction has occurred in a related system. The pending conditions are used to prevent a monitor from failing incorrectly.

Rationality

Term associated with comprehensive component testing in which signal inputs from various components are compared to verify that conditions agree.

Readiness Status

After a vehicle is repaired or if the battery or PCM has been disconnected, the Readiness Status for each non-continuous diagnostic monitor must be reset. This means that the vehicle must be operated through a complete drive cycle.

Society of Automotive Engineers (SAE)

Professional organization of automotive engineers and designers that establishes standards and conducts testing for many automotive-related functions within the automotive industry.

Short Term Adaptive

The short-term compensation made by the engine controller to vary injector pulse width. Based on oxygen sensor inputs, the PCM changes injector pulse width by a percentage to maintain minimal emissions output.

Stoichiometric

Term most often used to describe the ideal air/fuel mixture entering the intake. The point at which the production of emissions is at a minimum and catalyst conversion of emissions is most efficient. The stoichiometric air/fuel ratio is 14.7 to 1 measured in parts by weight.

Task Manager

PCM software designed to manage, regulate and perform various monitor testing.

Trip

A key cycle (key ON, run, key OFF/power down) where the enable criteria for a particular diagnostic are met and the diagnostic test runs.

Warm-up Cycle

A warm-up cycle is achieved when the engine coolant temperature rises at least 40° F (22.2° C) above engine start-up and achieves a minimum temperature of 160° F (71.1° C).

OBD II and What it Means

"OBD" stands for "onboard diagnostics." *OBD II* is a system developed by the *Society of Automotive Engineers* (*SAE*) to standardize automotive electronic diagnosis so technicians could use the same tools and analyzers to test any make and model without special adapters. *SAE* established guidelines that include:

- A universal diagnostic test connector, called the data link connector or DLC, with dedicated pin assignments.
- A standardized location for the DLC, visible under the driver's side dash.
- A standardized list of diagnostic trouble codes (DTC's) used by all manufacturers.
- The ability of the vehicle system to record a snapshot of operating conditions when a fault occurs that effect vehicle emissions.
- A glossary of standard terms, acronyms, and definitions used in system components.

In addition, *SAE* publishes a standard communications protocol for establishing hardware, software, and circuit parameters of *OBD II* systems. Unfortunately, vehicle manufacturers have different interpretations of the standard communications protocol. As a result, the generic *OBD II* communications scheme used varies, depending on the vehicle.

SAE publishes recommendations, not laws, but the Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) made many of *SAE*'s recommendations legal requirements that car makers were required to phase in over a three-year period.

- Beginning in 1994, vehicles with a new engine management computer—about 10% of each manufacturers fleet— were supposed to comply with *OBD II* standards.
- For 1995, *OBD II* systems were to appear on about 40% of the new vehicles sold.
  - — Some of the 1994–1995 *OBD II* systems were not fully compliant, so the government granted waivers to give manufacturers time to fine-tune their systems.
- Beginning with the 1996 model year, all new vehicles sold in the U.S.A must be fully *OBD II* compliant.

The Data Link Connector (DLC)

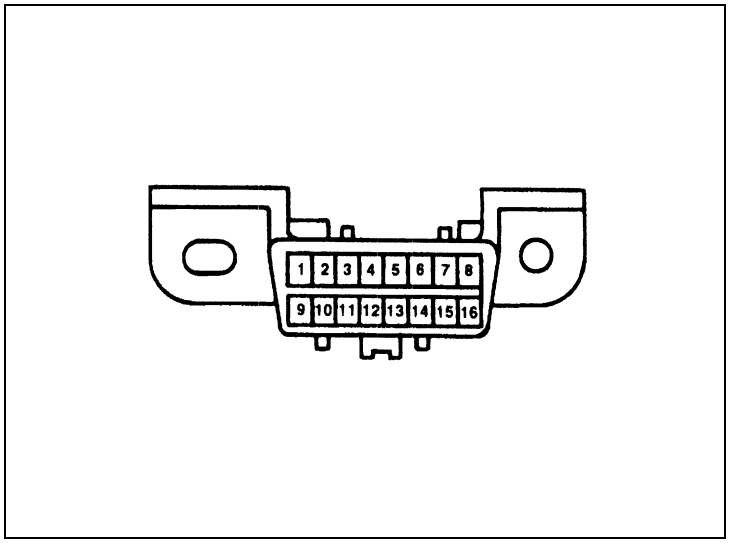


Figure A-3: DLC Configuration and Pin Assignments

The DLC is a 16-pin connector. The female half is on the vehicle, and the male end in on the analyzer data cable adapter. Pins are arranged in two rows of eight, numbered one to eight and nine to sixteen. See *Figure A-3*.

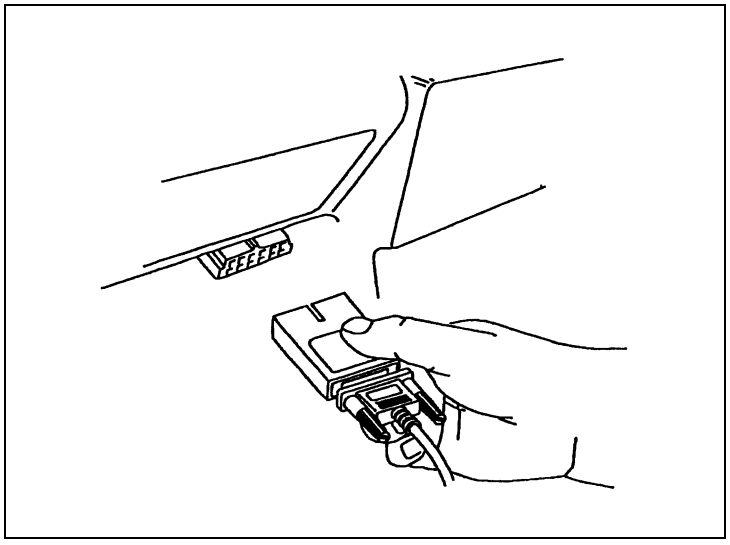


Figure A-4: Connect to the DLC While Sitting in Driver's Seat

Seven of the 16-pin positions have mandatory assignments, while vehicle manufacturers can use the remaining nine pins at their discretion. The connector is D-shaped and keyed so the two halves mate only one way. You should be able to connect to the DLC while sitting in the driver's seat as illustrated in *Figure A-4*. The DLC cannot be hidden behind panels and must be accessible without the use of tools. Although out of the normal line of sight, the DLC should be clearly visible to a technician when crouching.

This was the way it was supposed to be done! Information on locating the DLC is in *OBDII Connections, page A-18* of this manual. The numerous locations of the DLC can be located by vehicle type. Updates to this information are available from many after-market suppliers including:

Aftermarket Research Institute, Inc.
P.O. Box 648
Southeastern, PA 19399

The DLC is designed for analyzer access only. You cannot jumper any of the terminals to display codes on the instrument cluster warning lamp or malfunction indicator lamp (MIL). The MIL only alerts the driver and the technician that a code has been set.

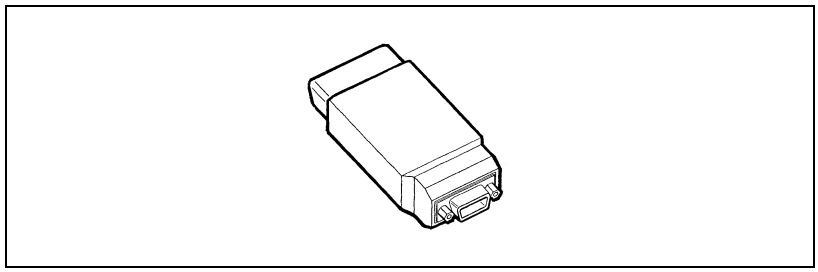


Figure A-5: OBD II Test Adapter

The 16-pin *OBD II* adapter shown in *Figure A-5* connects the analyzer to the DLC. The adapter attaches to the end of the analyzer data cable and is held in place by captive screws.

OBD II

The Powertrain Control Module (PCM) in *OBD II* vehicles monitors the function and operating efficiency of various emission-related circuits and components. When a monitored circuit or component is not operating properly, a diagnostic trouble code (DTC) is set.

OBD II Drive Cycles/Readiness Monitors

Each monitor requires that a certain sequence of events occur before monitoring their assign circuit. This is referred to as a drive cycle. The events required to activate each monitor vary, depending on the circuit and components.

When a Readiness Monitor parameter reads READY, the required sequence of events has completed and the monitor is ready to report problems and set Diagnostic Trouble Codes (DTC). When a Readiness Monitor reads NOT DONE, the required sequence of events has not completed and the monitor is therefore not ready to report the vehicles problems or set Diagnostic Trouble Codes. When a readiness monitor reads N/A, the vehicle is not equipped for that monitor. The paragraphs that follow give a brief description of each monitor.

OBD II Monitors

Misfire Monitor (MISFIRE)

Monitors engine misfire and designates by DTC the specific cylinder in which a misfire occurs. Misfire is a lack of combustion due to an absence of spark, poor fuel metering, poor compression, or any other cause. Typically, inputs from the Engine Coolant (ECT), Mass Air Flow (MAF), and Crankshaft Position (CKP) sensors are required to enable the monitor.

Comprehensive Component Monitor (COMPONENTS)

Determines when a malfunction occurs in any PCM input or output circuit that is not exclusively monitored by another monitor system. A malfunction can be a short, an open, or an out-of-range value. The monitor is enabled shortly after the engine is started. However, some individual components may not be available for monitoring.

Secondary Air System Monitor (AIR)

Monitors the function of the secondary air system, and test the ability of the air system to inject air into the exhaust. This monitor relies on the O_2 sensor feedback to determine the presence of air flow. Inputs from the ECT, Intake Air Temperature (IAT), and CKP sensor, and the O_2 sensor monitor are required to enable the AIR monitor.

Oxygen Sensor Monitors (O_2 SENSOR & O_2 HEATER)

Monitors the O_2 sensor switching frequency for degradation, and the heater circuit for proper operation (when equipped).

Exhaust Gas Recirculation System Monitor (EGR SYS)

Tests the integrity and flow characteristics of the EGR system. This monitor is enabled during EGR system operation, after certain base engine and operating conditions are satisfied. Inputs from the ECT, IAT, Throttle Position (TP) and CKP sensors are required to enable the EGR monitor.

Fuel System Monitor (FUEL SYS)

Monitors the adaptive fuel control system and determines when a learned value exceeds a specified threshold. Inputs from the ECT, IAT, and MAF or Manifold Absolute Pressure (MAP) sensors are required to enable this monitor.

Catalyst Efficiency Monitor (CAT)

Determines when the catalytic converter has fallen below a minimum level of effectiveness. Inputs from the ECT, IAT, and TP sensors are required to enable this monitor. Some vehicles may also require CKP and Vehicle Speed Sensor (VSS) inputs. When this monitor is READY, it relies mainly on inputs from the oxygen sensors.

Evaporative Emission System Monitor (EVAP SYS)

Checks the function of EVAP components and the ability to flow fuel vapor (hydrocarbons) to the engine. The sequence-of-events required to enable this monitor vary, depending on the Evaporative Emissions (EVAP) system components.

Heated Catalyst Monitor

No description available.

A/C Refrigerant Monitor

No description available.

Future *OBD II*

- Vehicles with electrical systems greater than 12V in the future, such as 42V, will probably use a different *OBD II* connector because of system voltage.
- In the next couple of years another communication protocol called Controlled Area Network (CAN) will begin to appear on vehicles.

Powertrain System Diagnostic Trouble Codes

Following are the recommended industry common trouble codes for the Powertrain Control System. These include systems that might be integrated into an electronic control module and used to control engine functions such as fuel, spark, idle speed, and vehicle speed (cruise control) as well transmission control. The fact that a code is recommended as a common industry code does not imply that it is a required code (legislated), an emission related code, or that it indicates a fault that causes the malfunction indicator light to illuminate. Refer to *DTC Naming Guidelines for Signals from Components, page A-11*.

Standardized Fault Code Format

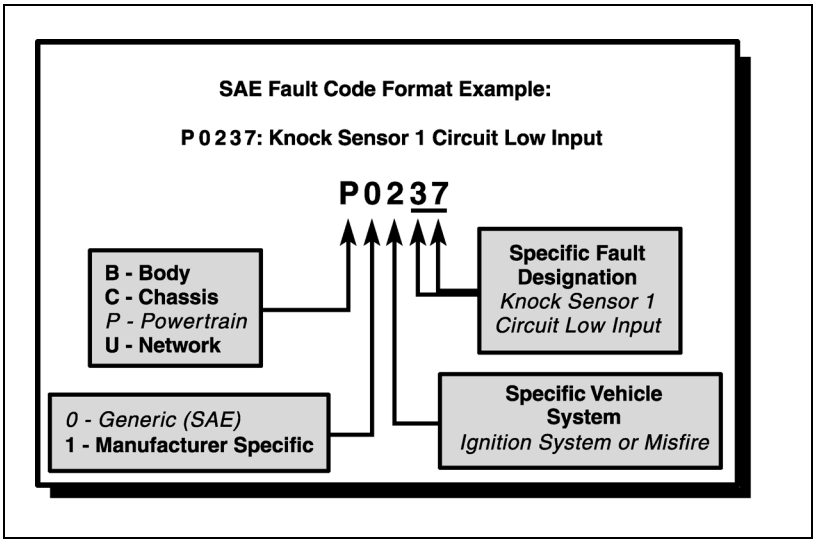


Figure A-6: SAE Fault Code Format Example

Codes Only—*OBD II* Diagnostic Trouble Codes

Diagnostic Trouble Codes (DTC) are reported in a five-character alphanumeric format.

First Character

The first character is a letter that defines the system where a code was set. Four letters are currently assigned:
P—Powertrain
B—Body
C—Chassis
U—Undefined

Second Character

The second character is:
0—*SAE* defined (generic) code
1—Manufacturer-defined (enhanced) code
2—With “B” or “C”, reserved for manufacturers
3—With “B” or “C”, reserved for *SAE*

✓ The meaning of 2 or 3 varies according to the system character (P, B, C, or U). See *First Character, page A-9*.

Third Character

The third DTC character indicates the system where the fault occurred:
1—fuel or air metering problem
2—fuel or air metering problem
3—ignition malfunction or engine misfire
4—auxiliary emission control system problem
5—vehicle or idle speed control system problem
6—computer or output circuit fault
7—transmission control problem
8—transmission control problem

Final Characters

The final characters in the DTC reveal the conditions that triggered the code. Different sensors, actuators and circuits are assigned blocks of numbers.

- The lowest number in the block indicates a general malfunction. This is the generic DTC.
- Higher numbers in the block—called enhanced codes—provide more specific information, such as low or high voltage, slow response, or an out-of-range signal.

Both the Federal Clean Air Act and California *OBD* legislation require uniformity among manufacture's fault code numeric format and messages associated with these codes. This format is defined in *SAE* J2012.

The Diagnostic Trouble Codes (DTC) consists of the alpha-numeric designators followed by three digits:

P0	***P3 Powertrain related codes***
P0	Powertrain codes controlled by *SAE*
P1	Powertrain codes controlled by the manufacturer
P2	Powertrain codes controlled by *SAE*
P3	Powertrain codes controlled by manufacturer (P3000–P3399)
P3	Powertrain codes controlled by *SAE* (P3400–3999)
B0	B3 Body related codes
B0	Body codes controlled by *SAE*
B1	Body codes controlled by the manufacturer
B2	Body codes controlled by the manufacturer
B3	Body codes reserved
C0	C3 Chassis related codes
C0	Body codes controlled by *SAE*
C1	Body codes controlled by the manufacturer
C2	Body codes controlled by the manufacturer
C3	Body codes reserved
U0	U3 Network related codes
U0	Network codes controlled by *SAE*
U1	Network codes controlled by the manufacturer
U2	Network codes controlled by the manufacturer
U3	Network codes reserved

DTC Naming Guidelines for Signals from Components

Component/System *SAE J1930*	Acronym *SAE J1930*	Modifier(1)	Noun Name	Parameter(1)
Air Conditioning	A/C	Clutch Status	N/A	Voltage
Air Conditioning	A/C	Clutch	Relay	
Crankshaft Position	CKP		Sensor	
Distributor Ignition*	DI		Low resolution	
Distributor Ignition	DI		HIgh resolution	
Engine Coolant	ECT		Sensor	Voltage
Engine Speed	RPM		Input	
Evaporative Emissions	EVAP	Canister Purge	Valve	
Evaporative Emissions	EVAP	Purge	Solenoid	
Exhaust Gas Recirculation	EGR		Solenoid	
Fan Control	FC		Relay 1	
Fan Control	FC		Relay 2	
Heated Oxygen Sensor	HO2S		In acronym	
Heated Oxygen Sensor	HO2S		In acronym Heater	Voltage
Heated Oxygen Sensor	HO2S			
Heated Oxygen Sensor	HO2S			
Idle Air Control	IAC		Valve	Voltage
Idle Air Control	IAC		Valve	
Ignition Control	IC		N/A	Voltage
Ignition Control	IC		N/A	Voltage
Injector	N/A			
Intake Air Temperature	IAT			Voltage
Knock Sensor	KS		In acronym	
Knock Sensor	KS		Module	
Malfunction Indicator Lamp	MIL		in acronym	
Manifold Absolute Pressure	MAP		Sensor	Voltage
Mass Air Flow	MAF		Sensor	Frequency
Mass Air Flow	MAF		Sensor	
Secondary Air Injection	AIR		Solenoid	
Temperature			Sensor	Voltage
Throttle Position	TP		Sensor	Voltage
Throttle Position	TP		Sensor	
Torque Converter Clutch	TCC		Solenoid	Stuck on
Vehicle Speed Sensor	VSS		In acronym	
Vehicle Speed Sensor *	VSS		In acronym	

***** Intermittent[1]. If used.

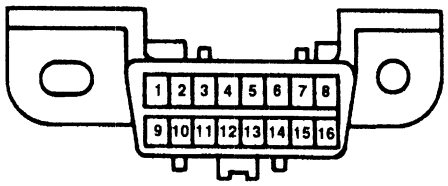
NOTE: Service Information uses Component/System ***SAE*** *J1930* or Acronym ***SAE*** *J1930*, Modifier(1), Noun Name, Parameter(1)

Communication Problems

Some *OBD II* equipped vehicles have problems communicating with the analyzer. A PCM may fail to communicate with the analyzer. If a problem exists with the wiring or other circuit parts on the vehicle, the analyzer may not be able to communicate with the PCM. The vehicle's failure to perform a test also can be a symptom for diagnosing a driveability problem.

Check Analyzer Operation

If the analyzer works properly on other vehicles then the problem is probably in the vehicle, not the analyzer.



PIN NO	ASSIGNMENTS
1	Manufacturer's Discretion
2	BUS + Line, *SAE* J1850
3	Manufacturer's Discretion
4	Chassis Ground
5	Signal Ground
6	Manufacturer's Discretion
7	K Line, ***ISO*** 9141
8	Manufacturer's Discretion
9	Manufacturer's Discretion
10	BUS – Line, *SAE* J1850
11	Manufacturer's Discretion
12	Manufacturer's Discretion
13	Manufacturer's Discretion
14	Manufacturer's Discretion
15	L Line, ***ISO*** 9141
16	Vehicle Battery Positive

Figure A-7: 16-pin DLC Connector Pinout

Testing the Diagnostic Connector —16-pin DLC

Unfortunately, vehicle manufacturers have different interpretations of *OBD II* requirements. This makes it difficult to define a specific approach to DLC problem diagnosis. In the *Figure A-7* you can see that:

- Some manufacturers use the *SAE J1850* BUS+ line but not the BUS-, while others use the *ISO 9141* K LINE, but not the L LINE.
- Ford has used the 3 lines, the *J1850* lines for powertrain tests, and the *ISO 9141* line for the non-powertrain tests (ABS and GEM).
- There have also been cars with no ground at pin 4.
- In addition, a pin location that is stuffed, doesn't necessarily mean that it is stuffed based on the *OBD II* requirements.

Use the *Ground Test, page A-13* and *Battery Voltage Test, page A-13* at the diagnostic center to help determine the reason the vehicle does not perform the diagnostic tests. Use a high-impedance digital voltmeter.

Ground Test

This test measures the voltage drop across the ground side of the diagnostic connector. An ideal system ground should have a voltage drop of 0.1 volt or less.

1. Connect the voltmeter positive (+) lead to the ground terminal in the diagnostic connector.
2. Connect the negative (–) lead directly to the battery negative (–) terminal.

✓ Do not connect the voltmeter negative lead to an engine or chassis ground

To check for an open circuit at the diagnostic connector ground terminal connect the voltmeter positive (+) lead to the battery positive and the negative lead to the connector ground terminal. You should read battery voltage. If the meter reads zero, the ground terminal is open.

Battery Voltage Test

This tests the battery voltage supply to the computer.

1. Connect the voltmeter positive (+) lead to the battery voltage terminal at the diagnostic connector.
2. Connect the negative (–) lead to the battery ground terminal. You should ready battery voltage.

OBD System Testing

For most emission control systems and components, *OBD II* requires that malfunctions are identified before a problem becomes serious enough to cause vehicle emissions to exceed Federal Test Procedure (FTP) standards by more than 50%.

Instead of monitoring emissions directly, the *OBD II* system looks for emission problems by monitoring virtually every component and system that can increase emissions.

OBD II monitoring includes systems and components that cannot be checked during conventional tailpipe I/M testing such as cold start emissions reduction devices and evaporative systems.

Diagnostic Fault Testing

In contrast, the *OBD II* system does not measure emissions but uses monitors and/or complex statistical methods to predict when the emissions exceed limits.

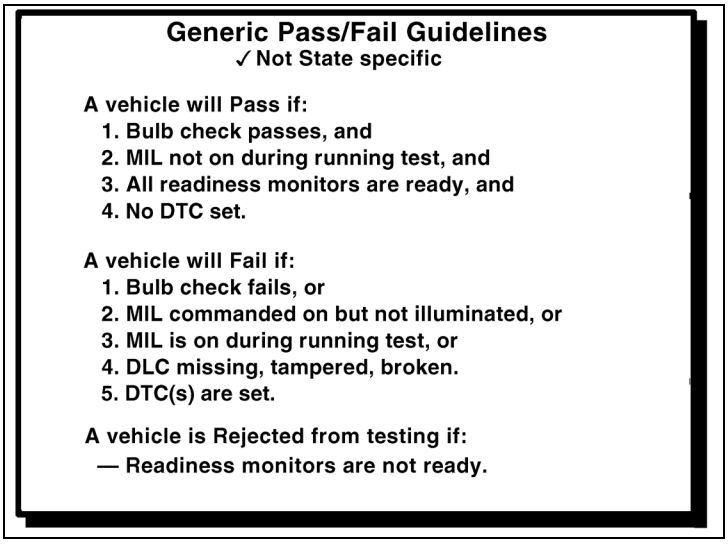


Figure A-8: Pass/Fail Requirements

Limits are usually 150% of the certification standard that applies to the vehicle.

Additionally, the rule requires monitoring specific components for faults **even if faults do not cause emissions to increase 150%.**

When emission and/or component malfunction is detected, the MIL must illuminate and a fault code must be stored that indicates the likely area of malfunction.

Drive Cycles

To predict if emission limits are exceeded or components are faulty, the PCM must test and/or monitor components for proper operation. Sometimes these component tests are complex and require the vehicle be operated in certain driving modes or conditions to complete.

- Drive Cycle
  - — Requires an engine startup and shut down.
- Warm-Up Cycle
  - — Requires engine operation that ensures the coolant temperature rises to a minimum of 40°F from engine startup and reaches a minimum of 160°F.
- A **Trip** means vehicle operation (following an engine-off period) of duration and driving mode such that all components and systems are monitored at least once by the diagnostic system. This is subject to the limitation that the trip monitoring conditions must all be encountered at least once during he first engine start portion of the applicable FTP cycle.

While there have been efforts to develop a “generic” drive cycle, this does not currently seem possible due to significant design differences between manufacturers.

Component Monitoring

When fuel level is low, manufacturers are allowed to disable monitoring systems affected by running out of fuel (e.g., misfire detection). However, these component monitoring systems can only be disabled if the fuel level is below 15% of nominal tank capacity.

Misfire Monitoring

The diagnostic system must monitor and report engine misfire and identify the specific cylinder experiencing the misfire. If more than one cylinder is misfiring, a separate code must indicate that multiple cylinders are misfiring.

Manufacturers must phase in expanded misfire monitoring conditions beginning with the late 1997 model year based on the following schedule.

- Equal or exceed 50% for MY 1997 through MY 1999;
- Equal or exceed 75% for MY 2000;
- Equal or exceed 90% for MY 2001; and
- 100% implementation for MY 2002.

Evaporative System Monitoring

The diagnostic system must be able to verify air flow from the evaporative system.

The diagnostic system also monitors the evaporative system for loss of hydrocarbon vapor in the atmosphere by performing a pressure or vacuum check of the complete system. Implementation of this requirement is mandatory only for MY 1996 or later vehicles.

Beginning with MY 2000, manufacturers must phase in diagnostic strategies to detect system leaks greater than or equal in magnitude to a leak caused by a 0.020 diameter orifice.

Secondary Air System Monitor

The diagnostic system must be able to indicate secondary air delivery system malfunction when the flow rate falls below a point when the vehicle would exceed 1.5 times any of the applicable FTP emission records.

Air Conditioning Refrigerant Monitoring

If the vehicle uses a refrigerant that could harm the stratospheric ozone layer or are reactive in forming atmospheric ozone, the diagnostic system must monitor for loss of the refrigerant.

Fuel System Monitoring

Manufacturers must continuously monitor the fuel system such that a vehicle's emissions would not exceed 1.5 times any the applicable Federal Test Procedure (FTP) standards.

Oxygen Sensor Monitoring

The diagnostic system must monitor the output voltage, response rate, and any other parameter which can affect emissions of all primary (fuel control) oxygen sensors for malfunction. It must also monitor the all secondary oxygen sensors (fuel trim control or monitoring device) for proper output voltage and response rate.

Exhaust Gas Recirculation System Monitoring

The EGR system must be monitored for both low and high flow rate malfunctions.

Positive Crankcase Ventilation (PCV) System Monitoring

Beginning with the MY 2002, manufacturers must phase-in diagnostic strategies to monitor the PCV system for system integrity. The following phase-in schedule applies:

- Equal or exceed 30% for MY 2002;
- Equal or exceed 60% for MY 2003; and
- 100% implementation for MY 2004.

Thermostat Monitoring

Beginning with the MY 2000, manufacturers must phase-in diagnostic strategies to monitor the thermostat for proper operation. The following phase-in schedule applies:

- Equal or exceed 30% for MY 2000;
- Equal or exceed 60% for MY 2001; and
- 100% implementation for MY 2002.

Comprehensive Component Monitoring

The diagnostic system must monitor any electronic powertrain component/system not otherwise described above which either provides input to (directly or indirectly), or receives commands from the onboard computer and which:

- Can affect emissions during any reasonable in-use driving condition, or;
- Is used as part of the diagnostic strategy for any other monitored system or component.

The Malfunction Indicator Lamp

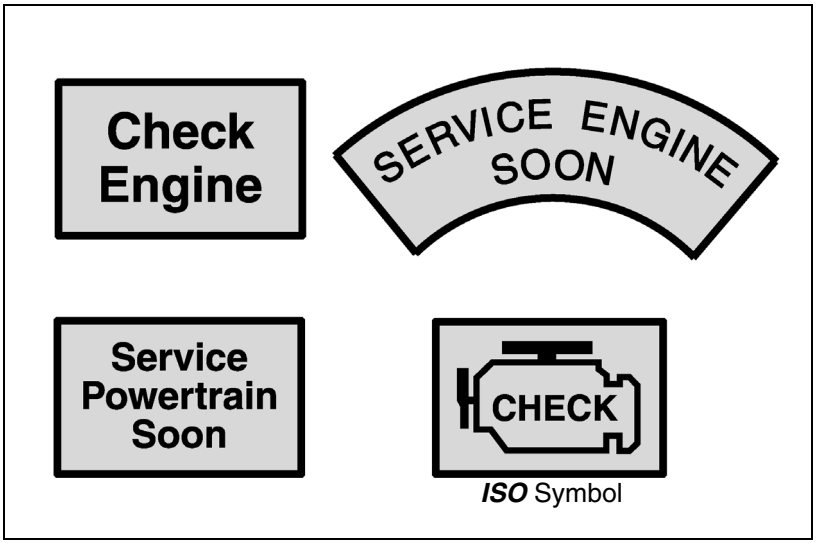


Figure A-9: Malfunction Indicator Lamps

All 1996 and subsequent model-year passenger car, light-duty trucks, and medium-duty vehicles must be equipped with a malfunction indicator light (MIL) located on the instrument panel that informs the vehicle operator of a malfunction of a powertrain component which affects emissions and provides input to, or receive output from, the onboard computer(s) or of the malfunction of the computer(s) itself.

The MIL must illuminate in the engine-run key position before engine cranking to indicate that the MIL is functional. The MIL must display one of the following phrases:

CHECK ENGINE
SERVICE ENGINE SOON
SERVICE POWERTRAIN SOON

Alternatively, the *ISO* engine symbol shown in *Figure A-9* may be substituted.

✓ The MIL must blink during misfire conditions.

Extinguishing the MIL

For misfire or fuel system malfunctions, the MIL may be extinguished if the fault does not recur when monitored during three subsequent sequential driving cycles with conditions similar to those under which the malfunction was first determined.

For all other faults, the MIL may be extinguished after three subsequent sequential driving cycles during which the monitor functions and the fault does not reoccur.

The diagnostic system may erase a fault code after 40 warm-up cycles if the fault has not re-registered except as noted above.

Readiness Codes

Readiness codes are used to indicate if the system has run all monitors available. If all monitors have been run and no faults were found then the assumption is made that the vehicle is “clean.”

OBDII Connections

The location of the *OBD II* (On-Board Diagnostics) connection on a vehicle depends on make, model, and year. Following the diagram is a list of connector locations with reference to the grid.

Use the *SAE* Standardized Link to connect to the vehicle's onboard diagnostics port in order to interrogate and retrieve fault codes. The information provided in this chapter was current at the time of printing. However, you are responsible for current applications. For the most up-to-date information, contact the:

Aftermarket Research Institute, Inc.
P.O. Box 648
Southeastern, PA 19399

✓ For additional information, see *The Data Link Connector (DLC), page A-5*.

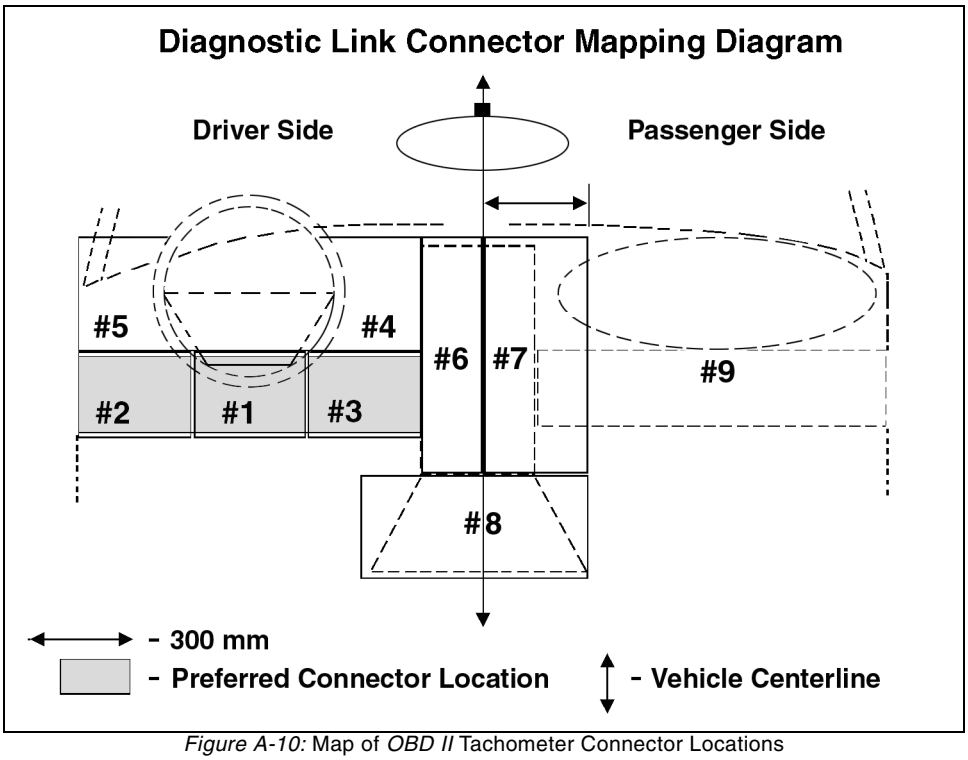


Figure A-10: Map of *OBD II* Tachometer Connector Locations

✓ This information is for reference only and may not be current for all states.

OBD II Connections Table

2002

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Acura	2002	3.2 CL, 3.2 TL	8	No	above shifter
		3.5 RL	8	Yes	front of shifter; remove ashtray
		MDX SUV	3	No	under dash at right; connector faces down
		NSX	7	No	under passenger dash
		RSX	3	No	
Aston Martin	2002	DB7 & Vanquish	3	Yes	left side of center console
Audi	2002	A4 1.8T & Quattro, A4 2.8 & Quattro, A4 Avant & 2.8 wagon, A6 &Quattro, A8 3.7 & 4.2	2	No	lower dash, left of steering column
	NOTE:	From 1998 to 2002 all Audi DLC's are located at 2, uncovered, including S4 Quattro and TT Coupe and Roadster			
Bentley	2002	All models	2	No	Engine codes A, B, C, D & E: DLC in lower fascia compartment; remove plastic cover panel; Engine code F, DLC is just above parking brake pedal
BMW	2002	3-Series, 5-Series, X-5 SUV	2	Yes	lower dash next to kick panel; pull cover down
		7-Series	2‘	Yes	lower A pillar; pull 1st cover off, then 2nd down
		X-5 SUV models	8	Yes	lower A pillar; pull 1st cover off, then 2nd cover
		Z-(all models)	7	Yes	passenger side dash; next to console
		Z8-series	2	Yes	lower dash; over clutch & brake pedals; pull cover down
		Mini Cooper & Cooper S	1	Yes	lower dash; over clutch & brake pedals; pull cover down

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Buick	2002	All Century	1	No	right of accelerator pedal
		LeSabre	2	No	lower edge dash; right of parking brake release
		Park Avenue	2	No	lower edge dash; between steering column & park brake
		Regal	3	No	lower edge dash; right of steering column next to console
		Rendezvous SUV	1	No	left of steering column
Cadillac	2002	Catera	2	No	
		Deville & Concours	2	No	lower edge dash; above park brake pedal
		Eldorado	1	No	
		Escalade SUV & EXT	2	No	bottom left corner of dash; above park brake
		Seville	2	No	lower edge dash; right of steering column & hood release
Chevrolet Cars	2002	Camaro, Malibu	3	No	
		Cavalier, Corvette, Metro	1	No	
Chevrolet Cars	2002	Impala, Lumina Sedan & Monte Carlo	3	No	lower edge dash; right of steering column
		Prizm	1	No	lower edge dash; right of parking brake pedal
		Venture van	1	No	lower edge dash; left of steering column
Chevrolet Trucks & SUVs	2002	Astro van	1	No	
		Avalanche	2	No	bottom left corner of dash; above parking brake
		Blazer & S-10 Trucks, & C/K Trucks	2	No	Blazer & S-series; lower edge dash; right of parking brake
		Chevy Van & Express, Express van, Suburban; Tahoe	2	No	lower edge dash; right of parking brake
		Silverado	2	No	lower edge dash; above parking brake
		Tracker SUV (also as a Geo)	3	No	lower edge dash; right of parking brake pedal
		Trailblazer	3	No	lower edge dash; reach back
	NOTE:	Many Chevrolet trucks come with a pull-off cover. This cover is not attached. It may be missing on some vehicles if discarded.			

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Chrysler	2002	Concorde, LHS, 300M	1	No	below lower instrument panel cover, near steering column; connector slants down
		Neon	2	No	below lower instrument panel cover, near steering column
		Prowler	2	No	below lower instrument panel cover, near cowl
		PT Cruiser	1	No	below steering column, under instrument panel
		Sebring Sedan	3	No	underneath instrument panel; near steering column; connector slants down
		Town & Country Van	2	No	below lower steering column cover; near park brake release cable handle
	NOTE:	On 1998 and later Chrysler vehicles, the DLC is located at 3, lower dash, between parking brake and brake pedal.			
Daewoo	2002	Lanos	6	No	
		Leganza	3	No	
		Nubira	2	Yes	behind fuse panel cover, on kick panel
Dodge	2002	Caravan & Grand Caravan	2	No	lower edge of dash, above parking brake pedal
		Dakota Truck & Durango	1	No	below steering column opening cover, near hood release cable handle
		Intrepid	1	No	below lower instrument panel cover, near steering column
		Neon, Stratus	3	No	lower edge dash surround; right of steering column
		Ram Van & Wagon	1	No	lower edge dash; above brake pedal
		Ram 1500 Truck	1	No	below steering column opening, near hood release cable handle
		Ram 2500 & 3500 Truck	6	No	underneath instrument panel, below ashtray
		Viper	2	No	underneath instrument panel, near clutch pedal
Ferrari	2002	All models	3	No	up high, under dash; may be close to steering column

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Ford Cars & SUVs	2002	Crown Victoria, Excursion SUV, Thunderbird, Windstar	3	No	
		Escape SUV	2	No	lower edge dash; right of hood release
		Escort & Escort ZX2	2	No	
		Expedition SUV	3	Yes	lower edge dash; above accelerator pedal; has removable plastic cover
		Explorer SUV	1	No	lower edge dash; above accelerator pedal; has removable plastic cover
		Focus	2	Yes	see in dash; left of hood release; behind unmarked pull-down door
		Mustang	3	No	rear of lower dash; next to trans. tunnel; faces left
		Taurus	1	No	lower edge dash; left of steering column
Ford Trucks	2002	All Econoline Vans & Club Wagon	3	Yes	lower edge dash; below steering column
		Explorer SportTrac	2	Yes	lower edge dash; left of steering column, cap snaps out
		All F Series Trucks	3	No	
		Ranger	2	No	left of hood release
GMC Trucks	2002	Denali	2	No	lower edge of dash; above parking brake
		Envoy	3	No	lower right edge of dash; reach back; next to console
		Safari Van, Savana Van	2	No	lower edge dash; below parking brake release
		Sierra, Suburban, Yukon	2	No	lower edge dash; above parking brake
		Sonoma	2	No	lower edge dash; right of parking brake
	NOTE:	Many GMC trucks come with a pull-off cover. This cover is not attached. It may be missing on some vehicles if discarded.			

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Honda	2002	Accord	2	No	above hood release; connector faces down
		Civic	3	No	lower right edge dash; behind console trim
		CR-V SUV	7	No	right of console
		Insight Hybrid	8	No	right side edge of console; near floor
		Odyssey Van	3	No	far right edge of dash; next to console; faces down
		S-2000 Roadster	7	No	under passenger dash; next to console
Hummer	2002	All models	2	No	Some vehicles may have a connector cover
Hyundai	2002	Accent	2	No	rear of lower edge dash; right of hood release
		Elantra	2	No	
		Sonata	3	No	rear lower edge dash; next to console
		Tiburon	1	No	lower edge dash; right of steering column
		Santa Fe SUV	2	Yes	located in fuse box panel
		XG-350	3	No	
Infiniti	2002	I-30 *	2	No	connector located near fuse box cover; connector faces down
		I-35	2	No	connector faces down
		Q-45 *	2	No	OBD II connector faces down
		QX-4 SUV	2	No	located by fuse box cover; connector faces down
	NOTE:	Vehicles with an * have two types of connectors: 1)Nissan-dedicated connector which works only with a Nissan scan tool or Nissan-dedicated laptop PC. 2)Standard 16-pin OBD II connector which may be used with any generic scan tool.			
Isuzu	2002	Axiom, Rodeo, Rodeo Sport	2	No	under dash at left; connector faces down
		Trooper	2	Yes	behind unmarked panel over hood release
Jaguar	2002	S-Type Sedan, All XJ Sedans, Van den Plas	3	No	
		X-Type AWD Sedan, All XK Sports	2	No	

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Jeep	2002	Grand Cherokee	2	No	Below steering wheel opening cover, near hood release cable handle
		Liberty	3	No	Below knee blocker cover near center console
		Wrangler	2	No	Below instrument panel, left of brake panel
Kia	2002	Optima	3	No	under dash next to console; connector faces down
		Rio	3	No	under dash next to console; connector faces down
		Sedona Van	1	No	connector faces down
		Spectra	3	No	
		Sportage SUV	3	No	
Lamborghini	2002	All Models	3	No	
		Diablo	3	No	find next to left side of console under dash
Land Rover	2002	Discover & Discovery II	3	No	lower right corner dash; next to console
		Freelander	6	No	left side of console, facing left
		Range Rover	7	No	lower left passenger dash; next to console
Lexus	2002	ES-300	1	Yes	bottom edge of dash; left of steering column
		GS-300 & 430	1	No	lower edge dash; next to steering column
		IS-300 & SportCross	2	Yes	lower left edge of dash; next to kick panel
		LS-430	2	Yes	
		LX-470 SUV	2	Yes	lower edge dash; next to console
		RX-300	1	Yes	lower edge dash; next to steering column
		SC-430	2	Yes	lower left side of dash

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Lincoln	2002	Blackwood Sport Luxury Truck	3	No	
		Continental	3	No	
		LS-6 & LS-8	3	No	lower edge dash; in line with ignition switch
		Navigator SUV	3	No	lower right edge of dash; above accelerator pedal
		Town Car	3	No	lower edge dash; right of steering column
Lotus	2002	Esprit	see ***NOTE***	No	connector may be in one of two places
	NOTE:	Location 9: passenger-side footwell, under dash; DLC is a non-fixed position at the end of a wiring pigtail; may be found in the engine compartment or in the tailgate area; in this location the connector is located immediately forward of the battery on side of the fuse/ relay center			
Maserati	2002	Spyder	1	No	right of steering column; angled down
Mazda	2002	All Mazda B-series pickup trucks	1	No	listing includes 2000, 2300, 2500, 3000 & 4000
		All Protege models & Protege 5	2	No	rear left edge dash; next to hood release; DLC faces down
		Tribute SUV	2	No	rear edge dash; right of hood release

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Mercedes Benz	2002	C Class	3	Yes	bottom of dash to right of red brake release lever
		CL Class	2	Yes	lower left corner of dash; near park brake pedal; hinged cover door opens to right
		CLK Class	3	Yes	bottom of dash next to right kick panel
		E Class	2	Yes	bottom of dash; adjacent to floorboard
		G-500 (Gelandewagen)	2	Yes	lower left corner of dash; adjacent to floorboard
		M Class	2	Yes	rear edge of lower dash; right of park brake pedal
		S Class	2	Yes	lower left corner of dash; near park brake pedal
		SL Class	3	Yes	lower right corner of dash; next to foot vent in right kick panel
		SLK Class	2	Yes	lower left corner of dash; behind red hood release lever; near floorboard
	NOTE:	All late-model Mercedes Benz covers are hinged			
Mercury	2002	Cougar	2	No	far left of dash; rear of lower edge
		Grand Marquis	3	No	
		Mountaineer SUV	1	No	lower edge dash next to steering column on left
		Sable	2	No	
		Villager Van	2	No	
MINI by BMW	2002	Mini Cooper & Cooper S	1	Yes	lower dash over clutch & brake pedals; pull cover down
Mitsubishi	2002	Diamante	1	No	
		Eclipse & Spyder	3	No	lower right edge dash; next to kick panel
		Galant	3	No	bottom right corner of dash; next to kick panel
		Mirage Coupe	3	No	
		Montero SUV	3	No	lower edge dash at far right; connector faces down
		Montero Sport	2	No	
Morgan	2002	Plus 8	9	No	below & behind lower left edge of passenger side dash

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Nissan	2002	All passenger car models	2	No	some DLC locations may be to rear, under dash. On Altimas DLC is angled down at far left
		Frontier Truck, X-Terra SUV	2	No	
		Pathfinder SUV	2	No	lower edge dash; right of hood release
		Quest Van	2	No	lower edge dash; left of steering column
Oldsmobile	2002	Alero	2	No	lower left edge dash; between steering column & hood release
		Aurora	1	No	
		Bravada	3	No	lower edge dash; between steering column & console
Panoz	2002	Esperante	3		
Pontiac	2002	Aztek	1	No	lower edge dash; right of park brake release
		Bonneville	2	No	lower left corner of dash; above park brake pedal
		Firebird	3	No	behind plastic panel at lower right corner of dash
		Grand AM	1	No	lower edge of dash; above parking brake pedal
		Montana Van	1	No	lower edge of dash; left of steering column
		Sunfire	1	No	on bracket at lower edge of dash; above foot rest
		Vibe	2	No	lower left side of dash; above foot rest
Porsche	2002	All 911 models, Carrera, Carrera 4, Carrera 4S, Turbo, GT2	2	No	
		Boxster, Boxster S	2	No	
Roll Royce	2002	Silver Seraph, Silver Spur	1	No	
Saab	2002	9-3	1	Yes	lower edge dash; right of steering column; plastic cover
		9-5	3	Yes	

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Saturn	2002	All S Series, All L Series	2	No	
		All L Series	2	No	bottom edge of dash; right of hood release
Subaru	2002	Forester, Impreza, WRZ	2	Yes	lower left dash; pull-down door
		Legacy, Brighton, Outback	2	No	left side of steering column
Suzuki	2002	Vitara, Grand Vitara XL-7	3	No	lower edge dash; right of steering column; near center console
Toyota	2002	Avalon, RAV 4 SUV	1	No	
		Camry	2	Yes	lower left side of dash
		Celica	2	Yes	
		Corolla	2	No	lower left side of dash
		Echo	2	Yes	
		Highlander SUV	2	Yes	lower edge dash; in cavity next to park brake
		Matrix	2	No	bottom edge of dash; above foot rest
Toyota	2002	MR-2 Spyder	1	No	left of steering column
		Prius Hybrid	3	No	
		RAV-4 SUV	1	No	
		Sequoia SUV	3	No	lower edge dash; mounted on a bracket; above accelerator pedal
		Solara (Camry)	1	No	lower edge dash; below steering column
		Tacoma Truck, Tundra Truck	3	No	lower edge dash; next to console; connector faces down
		4-Runner SUV	3	No	
Volkswagen	2002	Cabrio, Golf, Jetta; New Beetle	2	No	under dash at left side
		Eurovan	3	No	
		Passat	4	No	under dash at left side
		New Beetle	2	No	under dash at left side
Volvo	2002	C 70	8	Yes	in center console compartment under cover marked OBD
		S-40	6	No	
		S-60	2	Yes	bottom left corner of dash; behind swing-down door
		S 80	2	No	

2001

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Acura	2001	2.5 TL, 3.2 TL	9	No	next to seat heater switch; below radio
		3.2 CL, 3.2 TL	8	No	above shifter
		3.5 RL	8	Yes	front of shifter; behind ashtray
		Integra, 2.2 CL, 2.3 CL, 3.0 CL	8	No	passenger side of console
		MDX SUV	3	No	under dash at right; connector face down
		NSX	7	No	under passenger dash
Aston Martin	2001	DB7 & Vanquish	3	Yes	left side of center console
Audi	2001	A4 1.8T & Quattro, A4 2.8 & Quattro, A4 Avant & 2.8 wagon, A6 &Quattro, A8 3.7 & 4.2, Cabriolet	2	No	lower dash, left of steering column
	NOTE:	From 1998 to 2002 all Audi DLC's are located at 2, uncovered, including S4 Quattro and TT Coupe and Roadster			
Bentley	2001	All models	2	No	Engine codes A, B, C, D & E: DLC in lower fascia compartment; remove plastic cover panel; Engine code F, DLC is just above parking brake pedal
BMW	2001	3-Series, 5-Series, X-5 SUV	2	Yes	lower dash next to kick panel; pull cover down
		7-Series	6	Yes	below radio & A/C controls; pull 1st cover off, then 2nd cover
		Z8-series	2	Yes	lower dash; next to kick panel, pull cover down

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Buick	2001	All Century	1	No	at right of accelerator pedal
		LeSabre	2	No	lower edge dash; right of parking brake release
		Park Avenue	2	No	lower edge dash; between steering column & park brake
		Regal	3	No	lower edge dash; right of steering column; next to console
Cadillac	2001	Catera	2	No	
		Deville & Concours	2	No	lower edge dash; above park brake pedal (cap)
		Eldorado	1	No	
		Escalade SUV	2	No	lower edge dash; left of steering column; above park brake
		Seville	2	No	lower edge dash; right of steering column & hood release
Chevrolet Cars	2001	Camaro, Malibu	3	No	
		Cavalier, Corvette, Metro	1	No	
		Impala, Lumina Sedan & Monte Carlo	3	No	lower edge dash; right of steering column
		Prizm	1	No	lower edge dash; right of parking brake pedal
		Venture van	1	No	lower edge dash; left of steering column
Chevrolet Trucks & SUVs	2001	Astro van	1	No	
		Blazer & S-10 Trucks, & C/K Trucks	2	No	Blazer & S-series; lower edge dash; right of parking brake
		Chevy Van & Express, Express van, Suburban; Tahoe	2	No	lower edge dash; right of parking brake
		Silverado	2	No	lower edge dash; above parking brake
		Tracker SUV (also as a Geo)	3	No	lower edge dash; right of parking brake pedal
	NOTE:	Many Chevrolet trucks come with a pull-off cover. This cover is not attached. It may be missing on some vehicles if discarded.			

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Chrysler	2001	Concorde, LHS, 300M	1	No	below lower instrument panel cover, near steering column; connector slants down
		Neon	2	No	below lower instrument panel cover, near steering column
		Prowler	2	No	below lower instrument panel cover, near cowl
		PT Cruiser	1	No	below steering column, under instrument panel
		Sebring Convertible	2	No	lower edge dash; over hood release; by kick panel; connector slants down
		Sebring Sedan	3	No	underneath instrument panel; near steering column; connector slants down
		Town & Country Van	2	No	below lower steering column cover; near park brake release cable handle
	NOTE:	On 1998 and later Chrysler vehicles, the DLC is located at 3, lower dash, between parking brake and brake pedal.			
Daewoo	2001	Lanos	6	No	
		Leganza	3	No	
		Nubira	2	Yes	behind fuse panel cover, on kick panel
Dodge	2001	Caravan & Grand Caravan	2	No	lower edge of dash, above parking brake pedal
		Dakota Truck & Durango SUV	1	No	below steering column opening cover; near hood release cable handle
		Intrepid	1	No	below lower instrument panel cover; near steering column
		Neon, Stratus	3	No	lower edge dash surround; right of steering column
		Ram Van & Wagon	1	No	lower edge dash; above brake pedal
		Ram 2500 & 3500 Truck	6	No	underneath instrument panel, below ashtray
		Viper	2	No	underneath instrument panel; near clutch pedal

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Ferrari	2001	All models	3	No	up high, under dash; may be close to steering column
Ford Cars & SUVs	2001	Crown Victoria, Windstar	3	No	
		Escape SUV	2	No	lower edge dash; right of hood release
		Escort & Escort ZX2	2	No	
		Excursion SUV	3	No	
		Expedition SUV	3	Yes	lower edge dash; above accelerator pedal; has removable plastic cover
		Explorer SUV	2	Yes	lower edge dash; left of steering column
		Focus	2	Yes	below dash; L of hood release; behind unmarked pull-down door
		Mustang	3	No	rear of lower dash; next to transmission tunnel; faces left
		Taurus	2	No	lower edge dash; left of steering column
Ford Trucks	2001	All Econoline Vans & Club Wagon	3	Yes	lower edge dash; below steering column
		Explorer SportTrac	2	Yes	lower edge dash; left of steering column, cap snaps out
		All F Series Trucks	3	No	
		Ranger	1	No	lower edge dash; left of hood release
Geo	2001	Prizm	1	No	
		Tracker SUV	3	No	
GMC Trucks	2001	Denali, Denali XL, Envoy, Rally, Vandura, Savana Van	1	No	
		Safari Van	2	No	lower edge dash; below parking brake release
		Sierra, Suburban, Yukon	2	No	lower edge dash; above parking brake
		Sonoma	2	No	lower edge dash; right of parking brake
	NOTE:	Many GMC trucks come with a pull-off cover. This cover is not attached. It may be missing on some vehicles if discarded.			

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Honda	2001	Accord	2	No	above hood release; connector faces down
		Civic	3	No	lower right edge dash; behind console trim
		CR-V SUV	7	No	right of console
		Insight Hybrid	8	No	right side edge of console; near floor
		Odyssey Van	3	No	far right edge of dash; next to console; faces down
		S-2000 Roadster	7	No	under passenger dash; next to console
Hummer	2001	All models	2	No	Some vehicles may have a connector cover
Hyundai	2001	Accent	2	No	rear of lower edge dash; right of hood release
		Elantra	2	No	
		Sonata	3	No	rear lower edge dash; next to console
		Tiburon	1	No	lower edge dash; right of steering column
		Santa Fe SUV	2	Yes	located in fuse box panel
		XG-300	3	No	
Infiniti	2001	I-30 *	2	No	connector located near fuse box cover; connector faces down
		G-20	2	No	connector faces down
		Q-45 *	2	No	OBD II connector faces down
		QX-4 SUV	2	No	located by fuse box cover; connector faces down
	NOTE:	Vehicles with an * have two types of connectors: 1)Nissan-dedicated connector which works only with a Nissan scan tool or Nissan-dedicated laptop PC. 2)Standard 16-pin OBD II connector which may be used with any generic scan tool.			
Isuzu	2001	Rodeo, Rodeo Sport	2	No	under dash at left; connector faces down
		Trooper	2	Yes	behind unmarked panel over hood release
		VehiCross SUV	2	No	behind unmarked panel over hood release

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Jaguar	2001	S-Type Sedan, All XJ Sedans, Van den Plas, XJ-8, XJR, Super V8, XJ Sport, Van den Plas	3	No	
		All XK Sports Cars	2	No	
Jeep	2001	Cherokee	2	No	rear of lower left edge dash
		Grand Cherokee	2	No	below steering wheel opening cover; near hood release cable handle
		Wrangler	2	No	below instrument panel; left of brake panel
Kia	2001	All Vehicles	3	No	lower dash above accelerator pedal
		Optima	2	No	under dash by steering column
		Sportage SUV	3	No	
Lamborghini	2001	All Models	3	No	
		Diablo	3	No	find next to left side of console under dash
Land Rover	2001	Discover & Discovery II	3	No	lower right corner dash; next to console
		Range Rover	7	No	lower left passenger dash; next to console
Lexus	2001	ES-300	2	Yes	remove fuse box cover; plug is above fuse panel
		GS-300 & 430	1	No	lower edge dash; next to steering column
		IS-300 & SportCross	2	Yes	lower left edge of dash; next to kick panel
		LS-430	2	Yes	
		LX-470 SUV	2	Yes	lower edge dash; next to console
		RX-300	1	Yes	lower edge dash; next to steering column

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Lincoln	2001	Continental	3	No	
		LS-6 & LS-8	3	No	lower edge dash; in line with ignition switch
		Navigator SUV	3	No	lower right edge of dash
		Town Car	3	No	lower edge dash; right of steering column
Lotus	2001	Esprit	7	No	above passenger dash
Mazda	2001	All Mazda B-series pickup trucks	1	No	listing includes 2000, 2300, 2500, 3000 & 4000
		626	2	No	
		Millenia	3	No	lower right corner dash; next to tunnel
Mazda	2001	MPV Van	2	No	behind lower edge dash; to right of hood release
		MX-5 (Miata)	2	Yes	behind fuse box panel
		Protege	2	No	rear left edge dash; next to hood release
		Tribute SUV	2	No	rear edge dash; right of hood release
Mercedes -Benz	2001	C Class & CLK	3	Yes	
		All other models	2	Yes	
Mercury	2001	Cougar	2	No	far left of dash; rear of lower edge
		Grand Marquis	3	No	
		Mountaineer SUV	2	Yes	
		Sable	2	No	
Mitsubishi	2001	Diamante	1	No	
		Eclipse	3	No	lower right edge dash; next to kick panel
		Galant, Montero Sport	3	No	
		Mirage	2	No	
		Montero SUV	3	No	lower edge dash at far right; connector faces down

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Nissan	2001	All passenger car models, Frontier Truck, X-Terra SUV, 200-SX & SE	2	No	
		Pathfinder SUV	2	No	lower edge dash; right of hood release
		Quest Van	2	No	lower edge dash; left of steering column
Oldsmobile	2001	Alero	2	No	lower left edge dash; between steering column & hood release
		Aurora	1	No	
		Bravada	2	No	lower right edge dash; right of parking brake pedal
		Intrigue	3	No	lower edge dash; right of steering column; plastic cover
		Silhouette Van	1	No	lower edge dash; left of steering column
Plymouth	2001	Breeze, Neon, Prowler, Voyager	2	No	lower left of dash; over hood release; next to kick panel
Pontiac	2001	Aztek, Montana Van	1	No	lower edge dash; left of steering column
		Bonneville, Sunfire, Grand Am	1	No	
		Firebird, Grand Prix	3	No	
Porsche	2001	All 911 models, Carrera & Turbo	6	Yes	
		Boxter, Boxter S	2	No	
Roll Royce	2001	All models	2	No	
Saab	2001	9-3	1	Yes	lower edge dash; right of steering column; plastic cover
		9-5	3	Yes	
Saturn	2001	All S Series, All L Series	2	No	
Subaru	2001	Forester, Impreza & WRZ	2	Yes	lower left dash; pull-down door
		Legacy, Brighton & Outback	2	No	lower dash; below hood release; hinged cover

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Suzuki	2001	Vitara, Grand Vitara	3	No	lower edge dash; new right console kick panel
Toyota	2001	Avalon, RAV 4 SUV	1	No	
		Camry, Solara	1	No	lower edge dash; below steering column
		Celica	2	Yes	
		Corolla, Echo	2	No	
		Land Cruiser	2	No	behind fuse box cover
		MR-2 Spyder	1	No	left of steering column
		Prius Hybrid, T-100 Truck, 4-Runner SUV	3	No	
		Sequoia SUV	3	No	lower edge dash; above accelerator pedal
		Sienna Van	3	No	lower edge dash; mounted on a bracket; above accelerator pedal
		Tacoma Truck, Tundra Truck	3	No	lower edge dash; next to console; connector faces down
Volkswagen	2001	Cabrio, Golf, Jetta; New Beetle	2	No	under dash at left side
		Eurovan, Passat	3	No	
		GTI	6	No	remove ashtray; sliding cover; next to ashtray
Volvo	2001	C-70, V-90	8	Yes	in center console compartment under cover marked DLC
		S-40, V-40	6	No	
		S-80, V-70	2	No	

2000

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Audi	2000	A4 1.8T & Quattro, A4 2.8 & Quattro, A4 Avant & 2.8 wagon, A6 &Quattro, A8 3.7 & 4.2, Cabriolet	2	No	lower dash, left of steering column
	NOTE:	From 1998 to 2002 all Audi DLC's are located at 2, uncovered, including S4 Quattro and TT Coupe and Roadster			
Bentley	2000	All models	2	No	engine codes A, B, C, D & E: DLC in lower fascia compartment; remove plastic cover panel; Engine code F, DLC is just above parking brake pedal
BMW	2000	3-Series	2	Yes	lower dash next to kick panel; pull cover down
		5-Series, 8-Series	2	Yes	lower dash next to kick panel; pull 1st cover off, then 2nd down
		7-Series	6	Yes	below radio and A/C controls; pull 1st cover off, then 2nd down
		Z-(All models)	7	Yes	passenger side, next to console
		Z-8	2	Yes	lower dash; over clutch & brake pedals; pull cover down
Buick	2000	All Century	1	No	at right of accelerator pedal
		LeSabre	2	No	lower edge dash; right of parking brake release
		Park Avenue	2	No	lower edge dash; between steering column & park brake
		Regal	3	No	lower edge dash; right of steering column; next to console
Cadillac	2000	Catera	2	No	
		Deville & Concours	2	No	lower edge dash; above park brake pedal (cap)
		Eldorado	1	No	
		Escalade SUV & EXT	2	No	bottom left corner of dash; above parking brake
		Seville	2	No	lower edge dash; right of steering column & hood release

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Chevrolet Cars	2000	Camaro, Malibu	3	No	
		Cavalier, Corvette, Metro	1	No	
		Impala, Lumina Sedan & Monte Carlo	3	No	lower edge dash; right of steering column
		Prizm	1	No	lower edge dash; right of parking brake pedal
		Venture Van	1	No	lower edge dash; left of steering column
Chevrolet Trucks & SUVs	2000	Astro van	1	No	
		Blazer & S-10 Trucks, & C/K Trucks	2	No	Blazer & S-Series; lower edge dash; right of parking brake
		Chevy Van & Express, Express Van, Suburban; Tahoe	2	No	lower edge dash; right of parking brake
		Silverado	2	No	lower edge dash; above parking brake
		Tracker SUV (also as a Geo)	3	No	lower edge dash; right of parking brake pedal
	NOTE:	Many Chevrolet trucks come with a pull-off cover. This cover is not attached. It may be missing on some vehicles if discarded.			
Chrysler	2000	Cirrus, Concorde, LHS	3	No	
		Sebring Convertible	2	No	lower edge dash; over hood release; by kick panel; connector slants down
		Town & Country Van	2	No	below lower steering column cover; near park brake release cable handle
	NOTE:	On 1998 and later Chrysler vehicles, the DLC is located at 3, lower dash, between parking brake and brake pedal.			
Daewoo	2000	Lanos	6	No	
		Leganza	3	No	
		Nubira	2	Yes	behind fuse panel cover, on kick panel

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Dodge	2000	Avenger	3	No	lower right dash; next to console
		Caravan & Grand Caravan	2	No	lower edge of dash, above parking brake pedal
		Dakota Truck & Durango SUV	2	No	lower edge dash; left of hood release
		Neon, Stratus, Viper	2	No	under left side dash; pver hood rise; by kick panel
		Ram Van & Wagon	1	No	lower edge dash; above brake pedal
		Ram 2500 & 3500 Truck	6	No	underneath instrument panel, below ashtray
Ferrari	2000	All models	3	No	up high, under dash; may be close to steering column
Ford Cars & SUVs	2000	Contour	2	No	
		Crown Victoria, Windstar	3	No	
		Escort & Escort ZX2	2	No	
		Excursion SUV	3	No	
		Expedition SUV	3	Yes	lower edge dash; above accelerator pedal; has removable plastic cover
		Explorer SUV	2	Yes	lower edge dash; left of steering column
		Focus	2	Yes	below dash; L of hood release; behind unmarked pull-down door
		Mustang	3	No	rear of lower dash; next to transmission tunnel; faces left
		Taurus	2	No	lower edge dash; left of steering column
Ford Trucks	2000	All Econoline Vans & Club Wagon	3	Yes	lower edge dash; below steering column
		All F Series Trucks	3	No	
		Ranger	1	No	lower edge dash; left of hood release
Geo	2000	Prizm	1	No	
		Tracker SUV	3	No	

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
GMC Trucks	2000	Denali, Denali XL, Envoy, Rally, Vandura, Savana Van	1	No	
		Safari Van	2	No	lower edge dash; below parking brake release
		Sierra, Suburban, Yukon	2	No	lower edge dash; above parking brake
		Sonoma	2	No	lower edge dash; right of parking brake
	NOTE:	Many GMC trucks come with a pull-off cover. This cover is not attached. It may be missing on some vehicles if discarded.			
Honda	2000	Accord	2	No	above hood release; connector faces down
		Civic	2	No	OBD II connector faces down
		CR-V SUV	7	No	right of console
		Odyssey Van	3	No	far right edge of dash; next to console; faces down
		S-2000 Roadster	7	No	under passenger dash; next to console
Hummer	2000	All models	2	No	Some vehicles may have a connector cover
Hyundai	2000	Accent	2	No	rear of lower edge dash; right of hood release
		Elantra	2	No	
		Sonata	3	No	rear lower edge dash; next to console
		Tiburon	1	No	lower edge dash; right of steering column
Infiniti	2000	G-20	2	No	connector faces down
		I-30, Q-45 *	2	No	OBD II connector faces down
		QX-4 SUV	2	No	located by fuse box cover; connector faces down
	NOTE:	Vehicles with an * have two types of connectors: 1)Nissan-dedicated connector which works only with a Nissan scan tool or Nissan-dedicated laptop PC. 2)Standard 16-pin OBD II connector which may be used with any generic scan tool.			

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Isuzu	2000	Amigo, Rodeo	2	No	under dash at left; connector faces down
		Hombre Truck	2	No	lower edge dash; right of parking brake
		Trooper, VehiCross	2	Yes	behind unmarked panel over hood release
Jaguar	2000	XJ-8, XJR, Super V8, XJ Sport, Van den Plas	3	No	
		All XK SPorts Cars	2	No	
Jeep	2000	Cherokee	2	No	rear of lower left edge dash
		Grand Cherokee, Wrangler	2	No	rear of lower left edge dash
Kia	2000	All Vehicles	3	No	lower dash above accelerator pedal
		Sportage SUV	3	No	
Lamborghini	2000	Diablo	3	No	find next to left side under dash
Land Rover	2000	Discover & Discovery II	3	No	lower right corner dash; next to console
		Range Rover	7	No	lower left passenger dash; next to console
Lexus	2000	ES-300	2	Yes	remove fuse box cover; plug is above fuse panel
		GS-300 & 400	1	No	lower edge dash; next to steering column
		LS-400	2	Yes	above parking brake
		LX-470 SUV	2	Yes	lower edge dash; next to console
		RX-300	1	Yes	lower edge dash; next to steering column
		SC-300, SC-400	2	Yes	lower left side of dash
Lotus	2000	Esprit	9	No	above passenger dash
Mazda	2000	Millenia	3	No	
		MX-6,MVP,Protege,626	2	No	
Mercedes -Benz	2000	S430,S500	2	Yes	
		All Other Vehicles	1	No	

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Mitsubishi	2000	Mirage, Eclipse, Galant, Avenger, Sebring	3	No	
		Montero	2	No	
		Montero Sp, Nativa, Diamante	1	No	
Nissan	2000	All Vehicles	2	No	
Porsche	2000	All Vehicles	2	No	
Rover	2000	Discovery Series II	3	No	
		Range Rover	9	No	under passenger dash
Saab	2000	9-3	1	Yes	
		9-5	3	Yes	
Subaru	2000	Imperza, Legacy, Forester	1	Yes	
Suzuki	2000	Swift,Geo metro, Esteem	1	No	
		Vitara, GM Traker, Grand Vitara	1	No	
Toyota	2000	4-Runner 2WD, 4WD	3	No	
		Avalon	1	No	
		Solara (Camry)	1	No	
		Camry, ES 300	3	No	
		Celica	2	Yes	
		Corolla, Prizm	2	No	
		GS 300, GS 400	3	No	
		Land Cruiser, LX 470	3	No	
		LS 400	2	Yes	
		New Hybrid	7	No	
		New Small	2	Yes	
		RAV 4	3	No	
		RX 300	2	Yes	
		SC 300, SC 400	2	Yes	
		Sienna	3	Yes	
		Tacoma 2WD, 4WD	3	No	
		Tundra 2WD, 4WD	3	No	
Volvo	2000	C-70, S-70, V-70	8	Yes	
		S-40, V-40	6	Yes	
		S-80	2	Yes	

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Volkswagen	2000	New Beetle, Passat, Golf, Jetta	2	No	

1999

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Audi	1999	A4 1.8T & Quattro, A4 2.8 & Quattro, A4 Avant & 2.8 wagon, A6 &Quattro, A8 3.7 & 4.2, Cabriolet	2	No	lower dash, left of steering column
	NOTE:	From 1998 to 2002 all Audi DLC's are located at 2, uncovered, including S4 Quattro and TT Coupe and Roadster			
Bentley	1999	All models	2	No	Engine codes A, B, C, D & E: DLC in lower fascia compartment; remove plastic cover panel; Engine code F, DLC is just above parking brake pedal
BMW	1999	3-Series, 5-Series, 8-Series	2	Yes	lower dash next to kick panel; pull 1st cover off, then 2nd down
		7-Series	6	Yes	below radio and A/C controls; pull 1st cover off, then 2nd down
		Z-(All models)	7	Yes	passenger side, next to console
Buick	1999	All Century	1	No	at right of accelerator pedal
		LeSabre	2	No	lower edge dash; right of parking brake release
		Park Avenue	2	No	lower edge dash; between steering column & park brake
		Regal	3	No	lower edge dash; right of steering column; next to console
		Rivera	1	No	
Cadillac	1999	Catera	2	No	
		Deville & Concours	1	No	
		Eldorado	1	No	
		Escalade SUV & EXT	2	No	bottom left corner of dash; above parking brake
		Seville	2	No	lower edge dash; right of steering column & hood release

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Chevrolet Cars	1999	Camaro, Malibu	3	No	
		Cavalier, Corvette, Metro	1	No	
		Lumina Sedan & Monte Carlo	3	No	lower edge dash; right of steering column
		Prizm	1	No	lower edge dash; right of parking brake pedal
		Venture Van	1	No	lower edge dash; left of steering column
Chevrolet Trucks & SUVs	1999	Astro van	1	No	
		Blazer & S-10 Trucks, & C/K Trucks	2	No	Blazer & S-Series; lower edge dash; right of parking brake
		Chevy Van & Express, Express Van, Suburban; Tahoe	2	No	lower edge dash; right of parking brake
		Silverado	2	No	lower edge dash; above parking brake
		Tracker SUV (also as a Geo)	3	No	lower edge dash; right of parking brake pedal
	NOTE:	Many Chevrolet trucks come with a pull-off cover. This cover is not attached. It may be missing on some vehicles if discarded.			
Chrysler	1999	Cirrus, Concorde, LHS	3	No	
		Town & Country Van	2	No	below lower steering column cover; near park brake release cable handle
	NOTE:	On 1998 and later Chrysler vehicles, the DLC is located at 3, lower dash, between parking brake and brake pedal.			
Daewoo	1999	Lanos	6	No	
		Leganza	3	No	
		Nubira	2	Yes	behind fuse panel cover, on kick panel

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Dodge	1999	Avenger	3	No	lower right dash; next to console
		Caravan & Grand Caravan	2	No	lower edge of dash, above parking brake pedal
		Dakota Truck & Durango SUV	2	No	lower edge dash; left of hood release
		Intrepid	2	No	lower edge dash; between parking brake & pedal
		Neon, Stratus, Viper	2	No	under left side dash; pver hood rise; by kick panel
		Ram Van & Wagon	1	No	lower edge dash; above brake pedal
		Stealth	3	No	lower right edge of dash; nest to console
Ferrari	1999	All models	3	No	up high, under dash; may be close to steering column
Ford Cars & SUVs	1999	Contour	2	No	
		Crown Victoria, Windstar	3	No	
		Escort & Escort ZX2	2	No	
		Expedition SUV	3	Yes	lower edge dash; above accelerator pedal; has removable plastic cover
		Explorer SUV	2	Yes	lower edge dash; left of steering column
		Focus	2	Yes	below dash; L of hood release; behind unmarked pull-down door
		Mustang	3	No	rear of lower dash; next to transmission tunnel; faces left
		Taurus	2	No	lower edge dash; left of steering column
		Windstar	1	No	bottom edge dash; right of steering wheel
Ford Trucks	1999	All Econoline Vans & Club Wagon	3	Yes	lower edge dash; below steering column
		All F Series Trucks	3	No	
		Ranger	1	No	lower edge dash; left of hood release
Geo	1999	Prizm	1	No	
		Tracker SUV	3	No	

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
GMC Trucks	1999	Denali, Denali XL, Envoy, Rally, Vandura, Savana Van	1	No	
		Safari Van	2	No	lower edge dash; below parking brake release
		Sierra, Suburban, Yukon	2	No	lower edge dash; above parking brake
		Sonoma	2	No	lower edge dash; right of parking brake
	NOTE:	Many GMC trucks come with a pull-off cover. This cover is not attached. It may be missing on some vehicles if discarded.			
Honda	1999	Accord	2	No	above hood release; connector faces down
		Civic	2	No	OBD II connector faces down
		CR-V SUV	7	No	right of console
		Del Sol	7	No	under passenger side dash
		Odyssey Van	3	No	far right edge of dash; next to console; faces down
Hummer	1999	All models	2	No	Some vehicles may have a connector cover
Hyundai	1999	Accent	6	No	in coin box
		Elantra	2	No	
		Sonata	3	No	rear lower edge dash; next to console
		Tiburon	1	No	lower edge dash; right of steering column
Isuzu	1999	Amigo, Rodeo	2	No	under dash at left; connector faces down
		Hombre Truck	2	No	lower edge dash; right of parking brake
		Oasis Van	7	No	under passenger dash; next to console
		Trooper	2	Yes	behind unmarked panel over hood release
		VehiCross SUV	2	No	behind unmarked panel over hood release

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Infiniti	1999	I-30*	2	No	OBD II connector faces down; below fuse box
		Q-45 *	2	No	OBD II connector faces down
		QX-4 SUV	2	No	located by fuse box cover; connector faces down
	NOTE:	Vehicles with an * have two types of connectors: 1)Nissan-dedicated connector which works only with a Nissan scan tool or Nissan-dedicated laptop PC. 2)Standard 16-pin OBD II connector which may be used with any generic scan tool.			
Jaguar	1999	XJ-8, XJR, Super V8, XJ Sport, Van den Plas	3	No	
		All XK Sports Cars	2	No	
Jeep	1999	Cherokee	2	No	rear of lower left edge dash
		Grand Cherokee, Wrangler	2	No	rear of lower left edge dash
Kia	1999	All Vehicles	3	No	lower dash above accelerator pedal
		Sportage SUV	3	No	
Lamborghini	1999	All Models	3	No	
Land Rover	1999	Discover & Discovery II	3	No	lower right corner dash; next to console
		Range Rover	7	No	lower left passenger dash; next to console
Lexus	1999	ES-300	2	Yes	remove fuse box cover; plug is above fuse panel
		GS-300 & 400	1	No	lower edge dash; next to steering column
		LS-400	2	Yes	above parking brake
		LX-470 SUV	2	Yes	lower edge dash; next to console
		RX-300	1	Yes	lower edge dash; next to steering column
		SC-300, SC-400	2	Yes	lower left side of dash
Lotus	1999	Esprit	9	No	Above Passenger Dash

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Mazda	1999	MX-5 (Miata),MX-6,Protege,626	2	No	
		MVP	1	No	
Mercedes Benz	1999	All Vehicles	2	Yes	
Mitsubishi	1999	3000GT	3	No	
		Diamante	2	No	
		Eclipse & Spyder	3	No	lower right edge; next to kick panel
		Galant	3	No	bottom right corner of dash; next to kick panel
		Mirage	2	No	
		Montero SUV	2	No	
		Montero Sport	3	No	
Nissan	1999	All models	2	No	
Oldsmobile	1999	Alero	2	No	lower left edge dash; between steering column & hood release
		Aurora, L S S & Olds 88	1	No	
		Bravada	2	No	lower right edge dash; right of parking brake pedal
		Cutlass, Cutlass Supreme	3	No	
		Intrigue	3	No	lower edge dash; right of steering column; plastic cover
		Silhouette Van	1	No	lower edge dash; left of steering column
Panoz	1999	Roadster	3		
Plymouth	1999	Breeze, Prowler, Voyager	2	No	
		Neon	2	No	lower left of dash; over hood release; next to kick panel
		Voyager	2	No	lower edge of dash; above parking brake pedal

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Pontiac	1999	Bonneville	1	No	
		Firebird	3	No	
		Grand AM, Montana Van	1	No	lower edge of dash; left of steering column
		Sunfire	1	No	on bracket at lower edge of dash; above foot rest
		Vibe	2	No	lower left side of dash; above foot rest
Porsche	1999	All Vehicles	2	No	
Rolls Royce	1999	All models	2	No	
Rover	1999	911 models	3	No	
		Range Rover	9	No	under passenger dash
Saab	1999	9-3	1	Yes	lower edge dash; right steering column; plastic cover
		9-5	3	Yes	
Saturn	1999	All S Series	2	No	
Subaru	1999	Forester	1	Yes	left side of steering column; pull-down cover
		Impreza	1	Yes	left side of steering column
		Legacy, Brighton, Outback	2	Yes	left side of steering column
		Legacy Postal Vehicles (RHD)	2		on driving (right) side of instrument panel layout
Suzuki	1999	Esteem	31	No	lower dash; right of steering column
		X-90	3	No	
		Swift	3	No	lower dash; right of steering column
		Vitara, Grand Vitara XL-7	3	No	lower edge dash, right of steering column, near center console

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Toyota	1999	4-Runner SUV	3	No	
		Avalon	2	Yes	bottom left edge of dash; behind fuse block cover
		Camry, Solara (Camry)	1	No	lower edge dash; below steering column
		Celica	3	Yes	
		Corolla	1	No	
		Land Cruiser, Paseo	2	Yes	behind fuse box cover
		Prizm	1	No	
		RAV-4 SUV	3	No	behind lower edge dash
		Sienna Van	3	No	
		Supra	2	Yes	
		Tacoma Truck	3	No	
		T-100 Truck	3	No	
VOLVO	1999	S-80	2	Yes	
		All Other Vehicles	9	Yes	hand brake area
Volkswagen	1999	EuroVan	4	Yes	
		Golf,Jetta	7	No	
		New Golf, New Jetta,New Bettle, Passat, Cabrio	2	No	

1998

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Audi	1998	A4 1.8T & Quattro, A4 2.8 & Quattro, A4 Avant & 2.8 wagon, A6 &Quattro, A8 3.7 & 4.2, Cabriolet	2	No	lower dash, left of steering column
	NOTE:	From 1998 to 2002 all Audi DLC's are located at 2, uncovered, including S4 Quattro and TT Coupe and Roadster			
Bentley	1998	All models	9	Yes	bottom passenger side dash or in glove box
BMW	1998	3-Series, 5-Series, 8-Series	2	Yes	lower dash next to kick panel; pull 1st cover off, then 2nd down
		7-Series	6	Yes	below radio and A/C controls; pull 1st cover off, then 2nd down
		Z-(All models)	7	Yes	passenger side, next to console
Buick	1998	All Century	1	No	at right of accelerator pedal
		LeSabre	2	No	lower edge dash; right of parking brake release
		Park Avenue	2	No	lower edge dash; between steering column & park brake
		Regal	3	No	lower edge dash; right of steering column; next to console
		Rivera, Skylark	1	No	
Cadillac	1998	Catera	2	No	
		Deville & Concours	1	No	
		Eldorado	1	No	
		Seville	2	No	lower edge dash; right of steering column & hood release
Chevrolet Cars	1998	Camaro, Malibu	3	No	
		Cavalier, Corvette	1	No	
		Lumina Sedan & Monte Carlo	3	No	lower edge dash; right of steering column
		Venture Van	1	No	lower edge dash; left of steering column

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Chevrolet Trucks & SUVs	1998	Astro van	1	No	
		Blazer & S-10 Trucks, & C/K Trucks	2	No	Blazer & S-Series; lower edge dash; right of parking brake
		Chevy Van & Express, Express Van, Suburban; Tahoe	2	No	lower edge dash; right of parking brake
		Silverado	2	No	lower edge dash; above parking brake
		Tracker SUV (also as a Geo)	3	No	lower edge dash; right of parking brake pedal
	NOTE:	Many Chevrolet trucks come with a pull-off cover. This cover is not attached. It may be missing on some vehicles if discarded.			
Chrysler	1998	Cirrus, Concorde, LHS	3	No	
		Town & Country Van	2	No	below lower steering column cover; near park brake release cable handle
	NOTE:	On 1998 and later Chrysler vehicles, the DLC is located at 3, lower dash, between parking brake and brake pedal.			
Dodge	1998	Avenger	3	No	lower right dash; next to console
		Caravan & Grand Caravan	2	No	lower edge of dash, above parking brake pedal
		Dakota Truck & Durango SUV	2	No	lower edge dash; left of hood release
		Intrepid	2	No	lower edge dash; between parking brake & pedal
		Neon, Stratus, Viper	2	No	under left side dash; pver hood rise; by kick panel
		Ram Van & Wagon	1	No	lower edge dash; above brake pedal
		Stealth	3	No	lower right edge of dash; nest to console
Ferrari	1998	All models	3	No	up high, under dash; may be close to steering column

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Ford Cars & SUVs	1998	Contour	2	No	
		Crown Victoria	3	No	
		Escort & Escort ZX2	2	No	
		Expedition SUV	3	Yes	lower edge dash; above accelerator pedal; has removable plastic cover
		Explorer SUV	2	Yes	lower edge dash; left of steering column
		Mustang	3	No	rear of lower dash; next to transmission tunnel; faces left
		Taurus	2	No	lower edge dash; left of steering column
		Windstar	1	No	bottom edge dash; right of steering column
Ford Trucks	1998	All Econoline Vans & Club Wagon	3	Yes	lower edge dash; below steering column
		All F Series Trucks	3	No	
		Ranger	1	No	lower edge dash; left of hood release
Geo	1998	Metro, Prizm	1	No	
		Tracker SUV	3	No	
GMC Trucks	1998	Denali, Denali XL, Envoy, Rally, Vandura, Savana Van	1	No	
		Safari Van	2	No	lower edge dash; below parking brake release
		Sierra, Suburban, Yukon	2	No	lower edge dash; above parking brake
		Jimmy, Sonoma	2	No	lower edge dash; right of parking brake
	NOTE:	Many GMC trucks come with a pull-off cover. This cover is not attached. It may be missing on some vehicles if discarded.			
Honda	1998	Accord	6	No	behind ashtray; left of lighter
		Civic	2	No	OBD II connector faces down
		CR-V SUV	7	No	right of console
		Del Sol	7	No	under passenger side dash
		Odyssey Van	7	No	under passenger dash; next to console
		Prelude	7	No	under passenger dash; remove trim panel

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Hummer	1998	All models	2	No	Some vehicles may have a connector cover
Hyundai	1998	Accent	6	No	in coin box
		Elantra	2	No	
		Sonata	3	No	rear lower edge dash; next to console
		Tiburon	1	No	lower edge dash; right of steering column
Infiniti	1998	I-30*	2	No	OBD II connector faces down; below fuse box
		Q-45 *	2	No	OBD II connector faces down
		QX-4 SUV	2	No	located by fuse box cover; connector faces down
	NOTE:	Vehicles with an * have two types of connectors: 1)Nissan-dedicated connector which works only with a Nissan scan tool or Nissan-dedicated laptop PC. 2)Standard 16-pin OBD II connector which may be used with any generic scan tool.			
Isuzu	1998	Amigo, Rodeo	2	No	under dash at left; connector faces down
		Hombre Truck	2	No	lower edge dash; right of parking brake
		Oasis Van	7	No	under passenger dash; next to console
		Trooper	2	Yes	lower edge dash; right of parking brake
Jaguar	1998	XJ-8, XJR, Super V8, XJ Sport, Van den Plas	3	No	
		All XK Sports Cars	2	No	
Jeep	1998	Cherokee	2	No	rear of lower left edge dash
		Grand Cherokee, Wrangler	2	No	rear of lower left edge dash
Kia	1998	All Vehicles	3	No	lower dash above accelerator pedal
		Sportage SUV	3	No	
Lamborghini	1998	All Models	3	No	

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Land Rover	1998	Discover & Discovery II	3	No	lower right corner dash; next to console
		Range Rover	7	No	lower left passenger dash; next to console
Lexus	1998	ES-300	2	Yes	remove fuse box cover; plug is above fuse panel
		GS-300 & 400	1	No	lower edge dash; next to steering column
		LS-400	2	Yes	above parking brake
		LX-470 SUV	2	Yes	lower edge dash; next to console
		RX-300	1	Yes	lower edge dash; next to steering column
		SC-300, SC-400	2	Yes	lower left side of dash
Lotus	1998	Esprit	9	No	Above Passenger Dash
Mazda	1998	Millenia	3	No	
		Protege,626	2	No	
Mercedes -Benz	1998	All Vehicles	2	Yes	
Mitsubishi	1998	3000GT, Stealth	3	No	
		Avenger, Sebring	3	No	
		Diamante	2	No	
		Eclipse	3	No	
		Expo, Summit Wagon	2	No	
		Galant	3	No	
		Mirage	2	No	
		Montero	2	No	
		Montero Sp, Nativa	3	No	
Nissan	1998	Infiniti (All Vehicles)	2	No	
		Nissan (All Vehicles)	2	No	
Porsche	1998	911 models	6	Yes	
		Boxster	2	No	
Rolls Royce	1998	Silver Spur, Park Ward	9	No	under passenger dash
Rover	1998	Discovery	3	No	
		Range Rover	9	No	under passenger dash

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Saab	1998	900, 9000	1	Yes	
Subaru	1998	Legacy,Impreza,Forester	2	Yes	
Suzuki	1998	Esteem	1	No	
		Side Kick	1	No	
		Side Kick Sport	1	No	
		Swift, GM metro	1	No	
		X-90	1	No	
Toyota	1998	4Runner (2/4 WD)	3	No	
		Avalon	2	Yes	behind fuse cover
		Camry	3	No	
		Celica	3	Yes	
		Corolla	1	No	
		ES 300	3	No	
		GS 300/400	3	No	
		Land Cruiser	3	No	
		LS400	2	Yes	
		LX 470	3	No	
		Paseo	2	Yes	behind fuse cover
		Prizm	1	No	
		RAV4 (2/4 WD)	3	No	
		SC 300/400	2	Yes	
		Sienna	3	No	
		Supra	2	Yes	
		T100 (2/4 WD)	3	No	
		Tacoma (2/4 WD)	3	No	
		Tercel	2	Yes	behind fuse cover
Volvo	1998	S80	2	Yes	
		All Other Vehicles	9	Yes	hand brake area
Volkswagen	1998	EuroVan, Passat	4	No	
		Golf, Jetta, Cabrio	7	Yes	
		New Beetle	2	No	

1997

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Audi	1997	A4 1.8 & Quattro, A4 2.8 & Quattro, A4 Avant & 2,8 wagon, A6 & Quattro A8 3.7 & 4.2	2	No	lower dash, left of steering column
		Cabriolet	2	No	lower dash left of steering column
Bentley	1997	All models	9	Yes	bottom passenger side dash or in glove box
BMW	1997	3-Series, 5-Series, 8-Series	2	Yes	lower dash next to kick panel; pull 1st cover off, then 2nd down
		7-Series	6	Yes	below radio and A/C controls; pull 1st cover off, then 2nd down
		Z-(All models)	7	Yes	passenger side, next to console
Buick	1997	All Century	1	No	at right of accelerator pedal
		LeSabre	2	No	lower edge dash; right of parking brake release
		Park Avenue	2	No	lower edge dash; between steering column & park brake
		Regal	3	No	lower edge dash; right of steering column; next to console
		Rivera, Skylark	1	No	
Cadillac	1997	Catera	2	No	
		Deville & Concours, Eldorado	1	No	
		Fleetwood	3	No	
		Seville	2	No	lower edge dash; right of steering column & hood release
Chevrolet Cars	1997	Camaro, Caprice, Impala SS	3	No	
		Cavalier, Corvette	1	No	
		Lumina Sedan & Monte Carlo	3	No	lower edge dash; right of steering column
		Venture Van	1	No	lower edge dash; left of steering column

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Chevrolet Trucks & SUVs	1997	Astro van	1	No	
		Blazer & S-10 Trucks, & C/K Trucks	2	No	Blazer & S-Series; lower edge dash; right of parking brake
		Chevy Van & Express, Express Van, Suburban; Tahoe	2	No	lower edge dash; right of parking brake
		Silverado	2	No	lower edge dash; above parking brake
		Tracker SUV (also as a Geo)	3	No	lower edge dash; right of parking brake pedal
	NOTE:	Many Chevrolet trucks come with a pull-off cover. This cover is not attached. It may be missing on some vehicles if discarded.			
Chrysler	1997	Cirrus, Concorde, LHS	3	No	
		Town & Country Van	2	No	below lower steering column cover; near park brake release cable handle
Dodge	1997	Avenger	3	No	lower right dash; next to console
		Caravan & Grand Caravan	2	No	lower edge of dash, above parking brake pedal
		Colt Vista Wagon	2 / 5	No	left of connector location area
		Dakota Truck & Durango SUV	2	No	lower edge dash; left of hood release
		Intrepid	2	No	lower edge dash; between parking brake & pedal
		Neon, Stratus, Viper	2	No	under left side dash; pver hood rise; by kick panel
		Ram Van & Wagon	1	No	lower edge dash; above brake pedal
		Stealth	3	No	lower right edge of dash; nest to console
Eagle	1997	Summit Sedan	2	No	
		Summit Wagon	2 / 5	No	left of location area
		Vision	1	No	lower center dash; left of steering column
Ferrari	1997	All models	3	No	up high, under dash; may be close to steering column

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Ford Cars & SUVs	1997	Aerostar Van	3	Yes	
		Aspire, Probe	3	No	
		Contour	2	No	
		Crown Victoria	3	No	
		Escort & Escort ZX2	2	No	
		Expedition SUV	3	Yes	lower edge dash; above accelerator pedal; has removable plastic cover
		Explorer SUV	2	Yes	lower edge dash; left of steering column
		Mustang	3	No	rear of lower dash; next to transmission tunnel; faces left
		Taurus	2	No	lower edge dash; left of steering column
		Thunderbird	7	Yes	
		Windstar	1	No	bottom edge dash; right of steering column
Ford Trucks	1997	All Econoline Vans & Club Wagon	3	Yes	lower edge dash; below steering column
		All F Series Trucks	3	No	
		Ranger	1	No	lower edge dash; left of hood release
Geo	1997	Metro, Prizm	1	No	
		Tracker SUV	3	No	
GMC Trucks	1997	Denali, Denali XL, Envoy, Rally, Vandura, Savana Van	1	No	
		Safari Van	2	No	lower edge dash; below parking brake release
		Sierra, Suburban, Yukon	2	No	lower edge dash; above parking brake
		Jimmy, Sonoma	2	No	lower edge dash; right of parking brake
	NOTE:	Many GMC trucks come with a pull-off cover. This cover is not attached. It may be missing on some vehicles if discarded.			

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Honda	1997	Accord	6	No	behind ashtray; left of lighter
		Civic, Passport SUV	2	No	OBD II connector faces down
		CR-V SUV	7	No	right of console
		Del Sol	7	No	under passenger side dash
		Odyssey Van	7	No	under passenger dash; next to console
		Prelude	7	No	under passenger dash; remove trim panel
Hummer	1997	All models	2	No	Some vehicles may have a connector cover
Hyundai	1997	Accent	6	No	in coin box
		Elantra	2	No	
		Sonata	3	No	rear lower edge dash; next to console
		Tiburon	1	No	lower edge dash; right of steering column
Infiniti	1997	I-30*	2	No	OBD II connector faces down; below fuse box
		J-30*	1	No	OBD II connector concealed high up under dash; reach up to access
		Q-45 *	2	No	OBD II connector faces down
	NOTE:	Vehicles with an * have two types of connectors: 1)Nissan-dedicated connector which works only with a Nissan scan tool or Nissan-dedicated laptop PC. 2)Standard 16-pin OBD II connector which may be used with any generic scan tool.			
Isuzu	1997	Hombre Truck	2	No	lower edge of dash; right of parking brake
		Oasis Van	7	No	under passenger dash; next to console
		Rodeo	2	No	under dash at left; connector faces down
		Trooper	2	Yes	behind unmarked panel over hood release
Jaguar	1997	XJ-8, XJR, Super V8, XJ Sport, Van den Plas	3	No	
		All XK Sports Cars	2	No	

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Jeep	1997	Cherokee	2	No	rear of lower left edge dash
		Grand Cherokee, Wrangler	2	No	rear of lower left edge dash
Kia	1997	All Vehicles	3	No	lower dash above accelerator pedal
		Sportage SUV	3	No	
Lamborghini	1997	All Models	3	No	
Land Rover	1997	Defender 90	8	Yes	remove fuse box cover; plug is above fuse panel
		Discover & Discovery II	3	No	lower right corner dash; next to console
		Range Rover	7	No	lower left passenger dash; next to console
Lexus	1997	ES-300	2	Yes	remove fuse box cover; plug is above fuse panel
		GS-300 & 400	1	No	lower edge dash; next to steering column
		LS-400	2	Yes	above parking brake
		LX-450 SUV	2	Yes	lower right edge dash; next to console
		SC-300, SC-400	2	Yes	lower left side of dash
Lotus	1997	Esprit	9	No	above passenger dash
Mazda	1997	MVP	1	No	
		MX-5 (Miata),MX-6,626,Millenia	3	No	
		Protege	2	No	
Mercedes Benz	1997	All Vehicles	2	Yes	
Mitsubishi	1997	3000GT, Stealth	3	No	
		Avenger, Sebring	3	No	
		Diamante	2	No	
		Eclipse	3	No	
		Expo, Summit Wagon	2	No	
		Galant	3	No	
		Mirage	2	No	
		Montero	2	No	
		Montero Sp, Nativa	3	No	

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Nissan	1997	Infiniti (All)	2	No	
		Nissan (All)	2	No	
Porsche	1997	911 models	6	Yes	
		Boxster	2	No	
Rolls Royce	1997	Silver Spur, Silver Dawn, Park Ward, Limousine	9	No	under passenger dash
Rover	1997	Defender	6	Yes	under parcel tray
		Discovery	3	No	
		Range Rover	9	No	under passenger dash
Saab	1997	900, 9000	1	Yes	
Subaru	1997	Legacy, Impreza, Forester	2	Yes	
		SVX	3	Yes	
Suzuki	1997	Esteem	1	No	
		Side Kick	1	No	
		Side Kick Sport	1	No	
		Swift, GM metro	1	No	
		X-90	1	No	

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Toyota	1997	4Runner (2/4 WD)	3	No	
		Avalon	2	Yes	behind fuse cover
		Camry	3	No	
		Celica	3	Yes	
		Corolla	1	No	
		ES 300	3	No	
		GS 300	1	No	
		Land Cruiser	2	Yes	behind fuse cover
		LS4,00	2	Yes	
		LX 450	2	Yes	behind fuse cover
		Paseo	2	Yes	behind fuse cover
		Previa (2/4 WD)	6	Yes	top instrmt panel
		Prizm	1	No	
		RAV4 (2/4 WD)	3	No	
		SC 300/400	2	Yes	
		Supra	2	Yes	
		T100 (2/4 WD)	3	No	
		Tacoma (2/4 WD)	3	No	
		Tercel	2	Yes	behind fuse cover
Volvo	1997	S80	2	Yes	
		All Other Vehicles	9	Yes	hand brake area
Volkswagen	1997	Euro Van, Passat	4	Yes	
		Golf, Jetta, Cabrio	7	Yes	

1996

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Audi	1996	A4, Cabriolet, Quattro, Wagon	8	Yes	remove rear ashtray center console; behind sliding cover
		Cabriolet, A6	9	Yes	rear ashtray
Aston Martin	1996	DB7 Coupe	9	Yes	right side of center console
Bentley	1996	All models	9	Yes	bottom passenger side dash or in glove box
BMW	1996	3-Series, 5-Series, 8-Series	2	Yes	lower dash nest to kick panel, pull 1st cover off, then 2nd cover
		7-series	6	Yes	below radio & A/C controls, pull 1st cover off, then 2nd cover
		Z-3 (all models)	6	Yes	Center console below heater controls
Buick	1996	All Century	1	No	at right of accelerator pedal
		LeSabre	2	No	lower edge dash; right of parking brake release
		Park Avenue	2	No	lower edge dash; between steering column & park brake
		Regal	3	No	lower edge dash; right of steering column; next to console
		Rivera, Skylark	1	No	
		Roadmaster	3	No	
Cadillac	1996	Catera	2	No	
		Deville & Concours, Eldorado	1	No	
		Fleetwood	3	No	
		Seville	2	No	lower edge dash; right of steering column & hood release

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Chevrolet Cars	1996	Baretta, Corsica	2	No	
		Camaro, Caprice, Impala SS	3	No	
		Cavalier, Corvette	1	No	
		Lumina Sedan & Monte Carlo	3	No	lower edge dash; right of steering column
Chevrolet Trucks & SUVs	1996	Astro van	1	No	
		Blazer & S-10 Trucks, & C/K Trucks	2	No	Blazer & S-Series; lower edge dash; right of parking brake
		Express Van, Suburban; Tahoe	2	No	lower edge dash; right of parking brake
		Silverado	2	No	lower edge dash; above parking brake
		Tracker SUV (also as a Geo)	3	No	lower edge dash; right of parking brake pedal
	NOTE:	Many Chevrolet trucks come with a pull-off cover. This cover is not attached. It may be missing on some vehicles if discarded.			
Chrysler	1996	Cirrus, Concorde, LHS, New Yorker	3	No	
		Town & Country Van	2	No	below lower steering column cover; near park brake release cable handle
Dodge	1996	Avenger	3	No	lower right dash; next to console
		Caravan & Grand Caravan	2	No	lower edge of dash, above parking brake pedal
		Colt Vista Wagon	2 / 5	No	left of connector location area
		Dakota Truck & Durango SUV	2	No	lower edge dash; left of hood release
		Intrepid	2	No	lower edge dash; between parking brake & pedal
		Ram Van & Wagon	1	No	lower edge dash; above brake pedal
		Spirit	2	No	
		Stealth	3	No	lower right edge of dash; nest to console

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Eagle	1996	Summit Sedan	2	No	
		Summit Wagon	2 / 5	No	left of location area
		Vision	1	No	lower center dash; left of steering column
Ferrari	1996	All models	3	No	up high, under dash; may be close to steering column
Ford Cars & SUVs	1996	Aerostar Van	3	Yes	
		Aspire, Probe	3	No	
		Contour	2	No	
		Crown Victoria	3	No	
		Escort & Escort ZX2	2	No	
		Explorer SUV	2	Yes	lower edge dash; left of steering column
		Mustang	3	No	rear of lower dash; next to transmission tunnel; faces left
		Taurus	2	No	lower edge dash; left of steering column
		Thunderbird	7	Yes	
		Windstar	1	No	bottom edge dash; right of steering column
Ford Trucks	1996	Bronco	7	Yes	
		All Econoline Vans & Club Wagon	3	Yes	lower edge dash; below steering column
		All F Series Trucks	3	No	
		Ranger	1	No	lower edge dash; left of hood release
Geo	1996	Metro, Prizm	1	No	
		Tracker SUV	3	No	
GMC Trucks	1996	Denali, Denali XL, Envoy, Rally, Vandura, Savana Van	1	No	
		GMC G-Series Van	3	No	
		Safari Van	2	No	lower edge dash; below parking brake release
		Sierra, Suburban, Yukon	2	No	lower edge dash; above parking brake
		Jimmy, Sonoma	2	No	lower edge dash; right of parking brake
	NOTE:	Many GMC trucks come with a pull-off cover. This cover is not attached. It may be missing on some vehicles if discarded.			

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Hummer	1996	All models	2	No	Some vehicles may have a connector cover
Hyundai	1996	Accent	6	No	in coin box
		Elantra	2	No	
		Sonata	3	No	rear lower edge dash; next to console
Infiniti	1996	G-20*	2	No	This vehicle has only a Nissan dedicated connector behind fuse block lid
		I-30*	2	No	OBD II connector faces down, below fuse box
		J-30*	1	No	OBD II connector concealed high up under dash; reach up to access
		Q-45 *	2	No	OBD II connector faces down
	NOTE:	Vehicles with an * have two types of connectors: 1)Nissan-dedicated connector which works only with a Nissan scan tool or Nissan-dedicated laptop PC. 2)Standard 16-pin OBD II connector which may be used with any generic scan tool.			
Isuzu	1996	Hombre Truck	2	No	lower edge dash; right of parking brake
		Oasis Van	7	No	under passenger dash; next to console
		Rodeo	2	No	under dash at left; connector faces down
		Trooper	2	Yes	behind unmarked panel over hood release
Jaguar	1996	XJ-8, XJR, Super V8, XJ Sport, Van den Plas	3	No	
		XJS	2	No	
Jeep	1996	Cherokee	2	No	rear of lower left edge dash
		Grand Cherokee, Wrangler	2	No	rear of lower left edge dash
Kia	1996	All Vehicles	3	No	lower dash above accelerator pedal
		Sportage SUV	3	No	
Lamborghini	1996	All Models	3	No	

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Land Rover	1996	Discover & Discovery II	3	No	lower right corner dash; next to console
		Range Rover	7	No	lower left passenger dash; next to console
Lexus	1996	ES-300	2	Yes	remove fuse box cover; plug is above fuse panel
		GS-300 & 400	1	No	lower edge dash; next to steering column
		LS-400	2	Yes	above parking brake
		LX-450 SUV	2	Yes	lower right edge dash; next to fuse box panel
		RX-300	1	Yes	lower edge dash; next to steering column
		SC-300, SC-400	2	Yes	lower left side of dash
Mazda	1996	MVP	1	No	
		MX-5 (Miata),MX-3,MX-6, 626, Millenia	3	No	
		Protege	2	No	
Mercedes Benz	1996	All Vehicles	2	Yes	
Mitsubishi	1996	3000GT, Stealth	3	No	
		Avenger, Sebring	3	No	
		Diamante	2	No	
		Eclipse	3	No	
		Expo, Summit Wagon	2	No	
		Galant	3	No	
		Mirage	2	No	
		Montero	2	No	
		Montero Sp, Nativa	3	No	
		Truck(2WD)	2	No	
Nissan	1996	Infiniti (All)	2	No	
		Nissan (All)	2	No	
Porsche	1996	All Vehicles	6	Yes	
Rolls Royce	1996	Silver Spur, Silver Dawn, Park Ward, Limousine	9	Yes	under passenger dash

Manufacturer	Year	Model	Location *(See Figure A-10)*	Cover	Comments
Rover	1996	Discovery	3	No	
		Range Rover	9	No	under passenger dash
Saab	1996	900, 9000	1	Yes	
Subaru	1996	Legacy, Impreza, Forester	2	Yes	
		SVX	3	Yes	
Suzuki	1996	Esteem, Side Kick, Side Kick Sport, Swift, GM metro, X-90	1	No	
Toyota	1996	4-Runner (2/4 WD)	3	No	
		Avalon	2	Yes	behind fuse cover
		Camry	2	Yes	behind coin box
		Celica	3	Yes	
		Corolla	2	No	
		ES 300	3	Yes	
		GS 300	1	No	
		Land Cruiser	2	Yes	behind fuse cover
		LS400	2	Yes	
		Paseo	2	Yes	behind fuse cover
		Previa (2/4 WD)	6	Yes	top instrumt panel
		Prizm	1	No	
		RAV4 (2/4 WD)	3	No	
		SC 300/400	2	Yes	
		Supra	2	Yes	
		T100 (2/4 WD)	3	No	
		Tacoma (2/4 WD)	3	No	
		Tercel	2	Yes	behind fuse cover
Volvo	1999	S80	2	Yes	
		All Other Vehicles	9	Yes	hand brake area
Volkswagen	1996	Cabrio, Golf, Jetta	7	Yes	
		Euro Van, Passat	4	Yes	

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